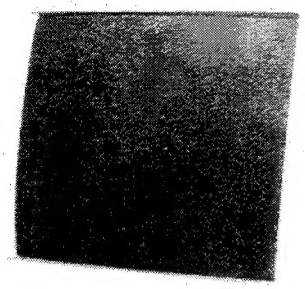
AUGUST 1991

MITSUBISHI

Service Manual

COLOUR MONITOR



MODEL

EUM-1491A

CAUTION

Before servicing this product, it is important that the serviceman reads the "SAFETY PRECAUTIONS" and "PRODUCT SAFETY NOTICE" in this service manual.

SPECIFICATIONS

- **Picture tube** 13" viewable, 90 degree deflection
  0.28 mm trio dot pitch
  Tinted glass, Non-glare
  P22, Medium-short persistence
- **Video Band width** 30 MHz
- **Resolution** RGB TTL/ANALOG
  800 dots Horizontal
  600 lines Vertical
  Composite Video
  300 dots Horizontal
  500 line Vertical
- **Input Signal** Comp. video: PAL
  RGB: video: TTL Positive 8/16/64 Colours
  Analogue 0.6 Vp-p positive
  Sync.: Separate sync. TTL±HD, ±VD
  Comp. sync. TTL ±HD/VD
  Comp. sync. on green video
- **Connector** BNC Jack
  D-Sub 9-pin
  D-Sub 25-pin
- **Synchronization** Horizontal: 15.6 kHz to 38 kHz (Auto-Tracking)
  Vertical: 45 Hz to 90 Hz (Auto-Tracking)
- **Power Input** AC 220~240 V 50 Hz
- **Power Consumption** 85 watts
- **Dimension** 362 mm(W)×328 mm(H)×383 mm(D)
  14-1/4" ×12-29/32" ×15-5/64"
- **Unit Net Weight** 14.5 kg (32.0 lbs)
- **Special Features**
  * Automatic tracking of wide range horizontal and vertical scanning frequencies.
  f(H): 15.6 ~ 38 kHz
  f(V): 45 ~ 90 Hz
  * Size and position of the screen can be adjusted with external controls.
  * High-resolution colour CRT, 0.28mm trio dot pitch, conductive coating, tinted glass.
  * Diverse displays are obtainable by inputs of various signals such as composite video, RGB TTL, analogue and monochrome.

MITSUBISHI ELECTRIC

SAFETY PRECAUTIONS

NOTICE: Observe all cautions and safety related notes located inside the receiver cabinet and on the receiver chassis.

WARNING

1. Operation of these receivers outside the cabinet or with the cover removed, involves a shock hazard from the receiver power supplies. Work on the receiver should not be attempted by anyone who is not throughly familiar with precautions necessary when working on high voltage equipment.
2. Do not install, remove or handle the picture tube in any manner unless shatter-proof goggles are worn. People not so equipped should be kept away while the picture tube is being handled. Keep the picture tube away from the body while handling.
3. When service is required, observe the original lead dress. Extra precaution should be given to assure correct lead dress in the high voltage area. Where a short-circuit has occurred, replace those components that indicate evidence of overheating.

LEAKAGE CURRENT COLD CHECK

Before returning the receiver to the customer, it is recommended that the leakage current be measured according to the following methods.
With the AC plug removed from the 220~240 AC source, place a jumper across the two AC plug prongs. Turn the receiver AC switch on. Using on OHM-METER, connect one lead to the jumpered AC plug and touch the other lead to each exposed metal part (antennas, screwheads, etc.), particularly any exposed metal part having a return path to the chassis. Exposed metal parts having a return path to the chassis should have a minimum resistance reading of 1 megohm. Any resistance below this value indicates an abnormality which requires corrective action.

PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in colour monitor have special safety related characteristics.
These characteristics are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc.
Replacement parts which have these special safety characteristics are identified in this service manual.
Electrical components having such features are identified by shading on the schematic diagram and the parts list of this service manual and by marking on the supplementary sheet for this chassis to be issued subsequently.
Therefore replacements for any safety parts should be identical in value and characteristics.

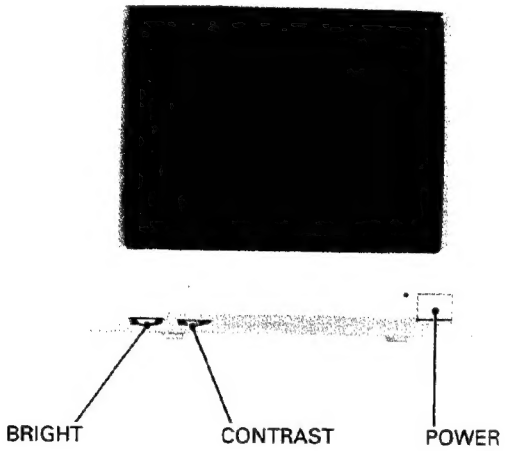


Fig. 1 Controls

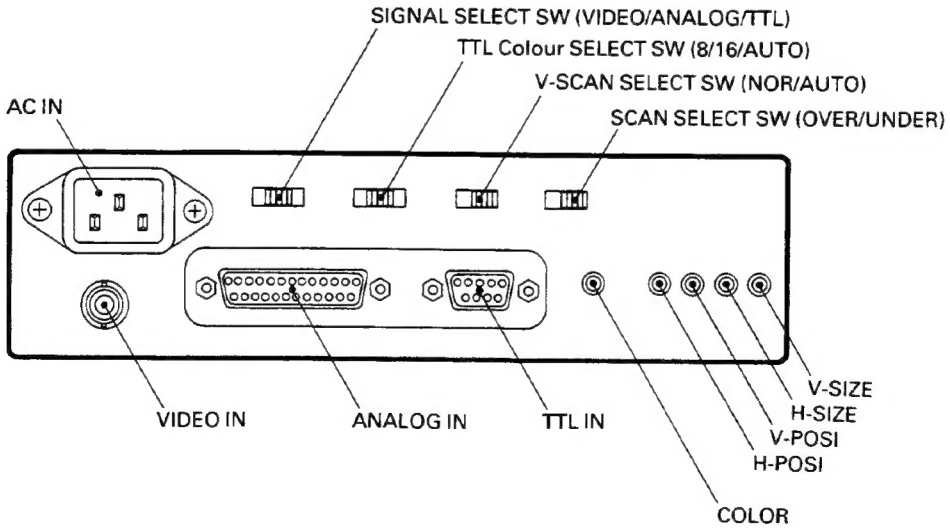


Fig. 2 Terminals

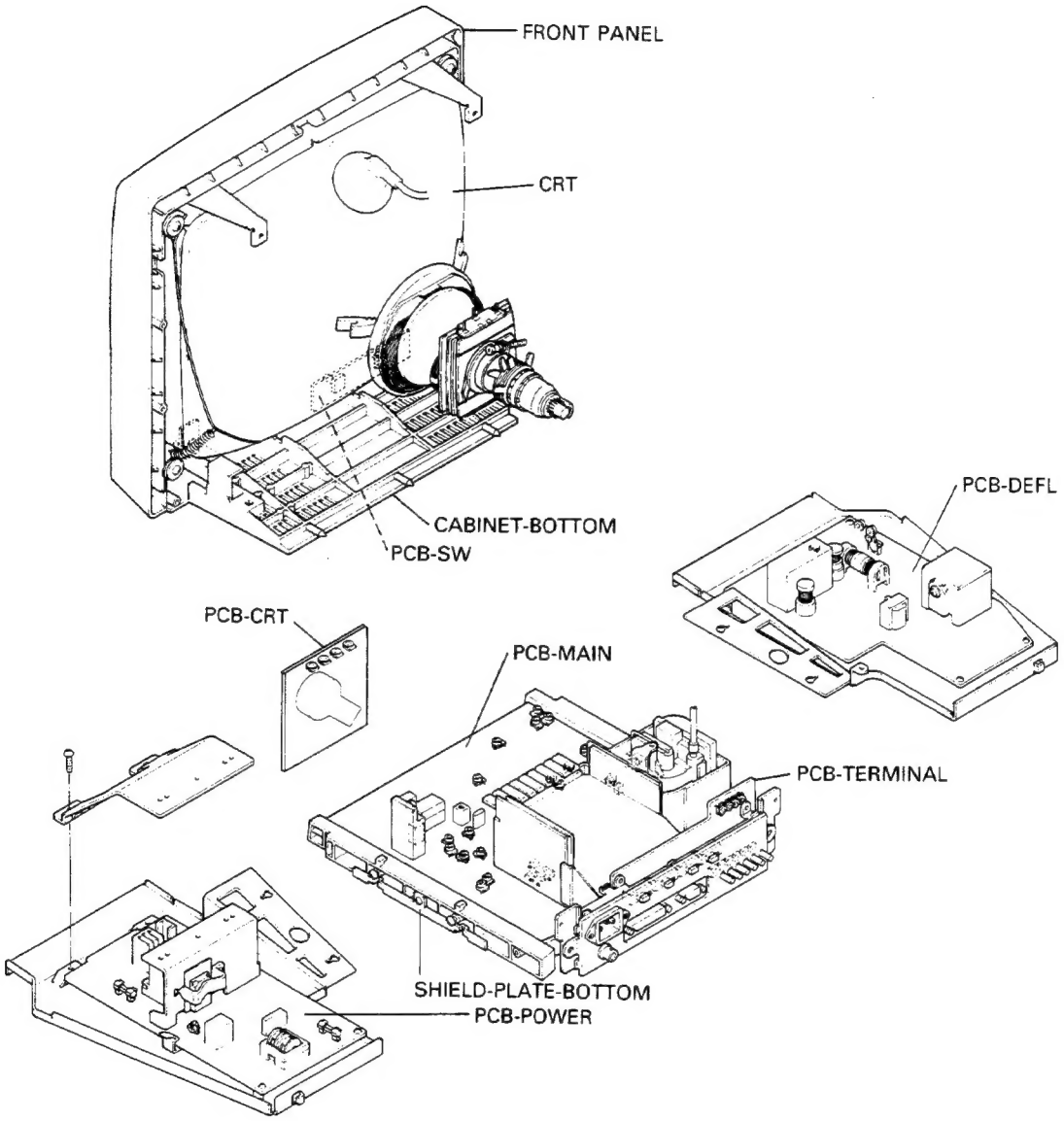

FRONT PANEL
CRT
CABINET-BOTTOM
PCB-SW
PCB-DEFL
PCB-CRT
PCB-MAIN
PCB-TERMINAL
SHIELD-PLATE-BOTTOM
PCB-POWER

Fig. 3

Disassembly

1. Place the monitor on a table with the face facing downward.
   Caution: Cover the surface of the table with a cushion, blanket, or else so that the face shall not be scored.
2. Remove the back cover by unscrewing six screws.
   (2 screws at the top of the back cover, two screws at two sides of the rear panel, and 2 screws on two sides at the bottom of the back cover)
3. Set the monitor upright on the table.
4. Remove the SHIELD-PLATE-TOP by unscrewing six screws.
   Remove the SHIELD-PLATE-REAR by slightly lifting upwards after removing two fastening screws.
5. Place a plate with a thickness of about 10 mm below the CABINET-BOTTOM for floating the rear of the monitor.
   Caution: If the bracket fastening screws are removed without floating the rear of the cabinet, an excess force may act on the PCB CRT and the CRT, damaging them.
6. Remove two screws which fastening the bracket to the front panel on each side, and draw out the entire chassis to the operator side.
   Caution: Pull the chassis by paying attention to the wires and other parts.
7. Remove two screws from the two sides of the SHIELD-PLATE-TERMINAL.
   Loosen two screws fastening the bracket-POWER to the chassis. Raise the bracket slightly and turn it down to the left side.
8. Remove one screw which fastens the right bracket-DEFL to the flyback-trans, and turn down to the right side.
9. To check the rear side of the PCB-MAIN, loosen two screws fastening the SHIELD-PLATE-BOTTOM.

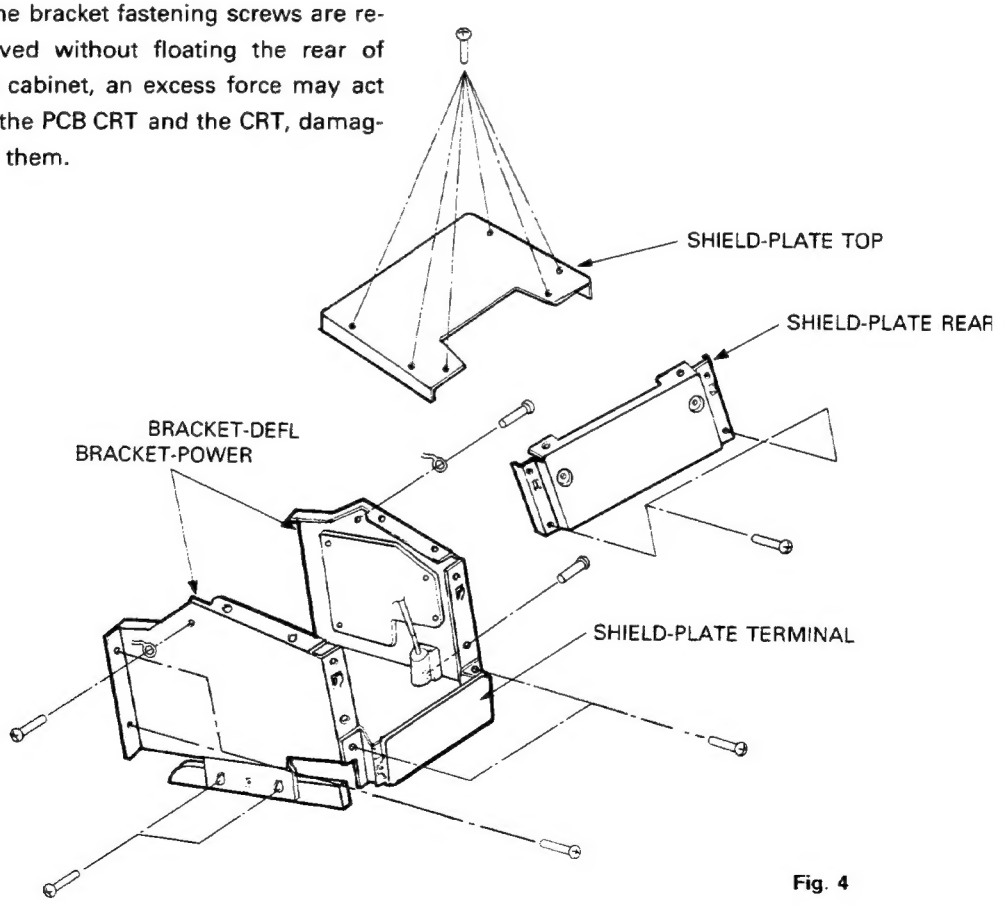


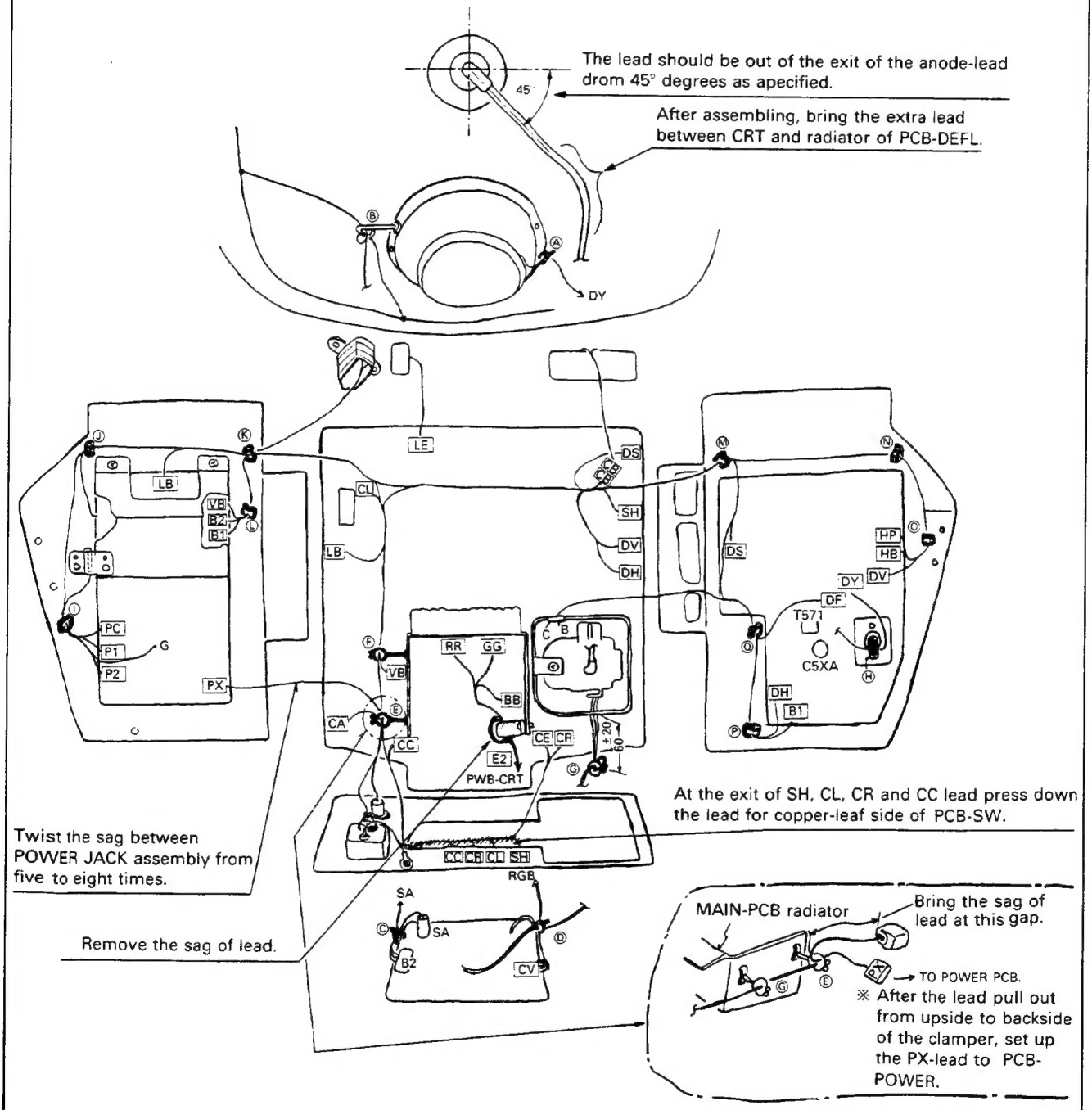
Fig. 4

LEAD DRESSING

The lead wires to be clamped are listed in the table below.

Note: The inner wires are routed or clamped so that they do not come close to the heat generating or high-tension parts. After servicing route all wires in their original position.

The anode lead wires are routed so no tensile strength is applied to the anode cap. If the mounting angle of the anode cap and the route of the anode lead wires are changed, return them to the initial angle and route.



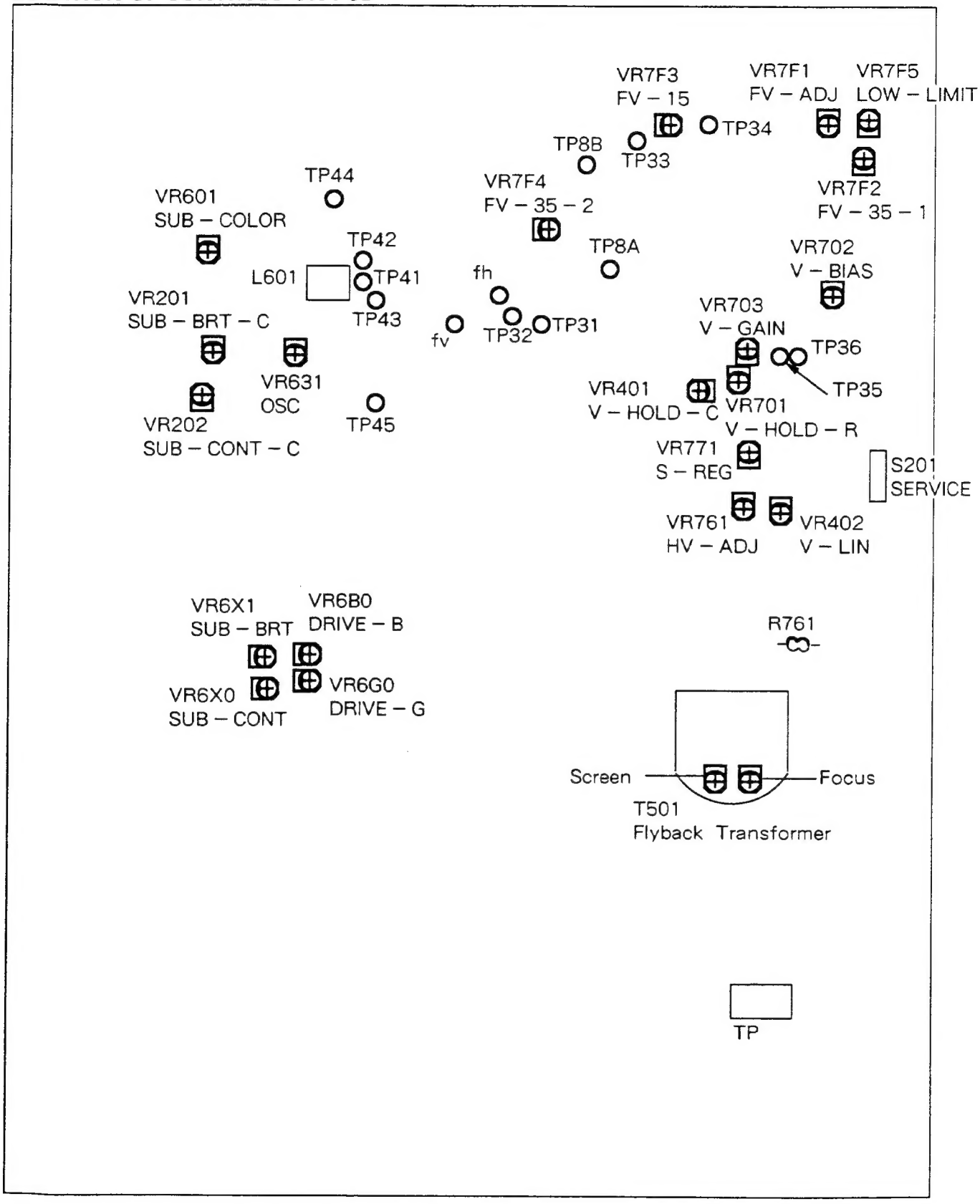
CONNECTOR LEAD FOR CLAMPER LIST

MARK	LEADS TO BE CLAMPED
Ⓐ	DY
Ⓑ	SA
Ⓒ	SA, B2, Blue lead from CRT-SUB
Ⓓ	CV, Focus-Screen lead
Ⓔ	CA, PX
Ⓕ	VB
Ⓖ	Focus-Screen lead
Ⓗ	DY
Ⓘ	PC, P1, P2, Blue lead from PCB POWER
Ⓙ	P1, P2, PC, HC
Ⓚ	B1, B2, VB, LB, P1, P2, HC
Ⓛ	B1, B2, VB
Ⓜ	HB, DV, HP, B1, DH, DS
Ⓝ	HB, DV, HP
Ⓞ	HB, DV, HP
Ⓟ	B1, DH
Ⓠ	B1, DH, DF

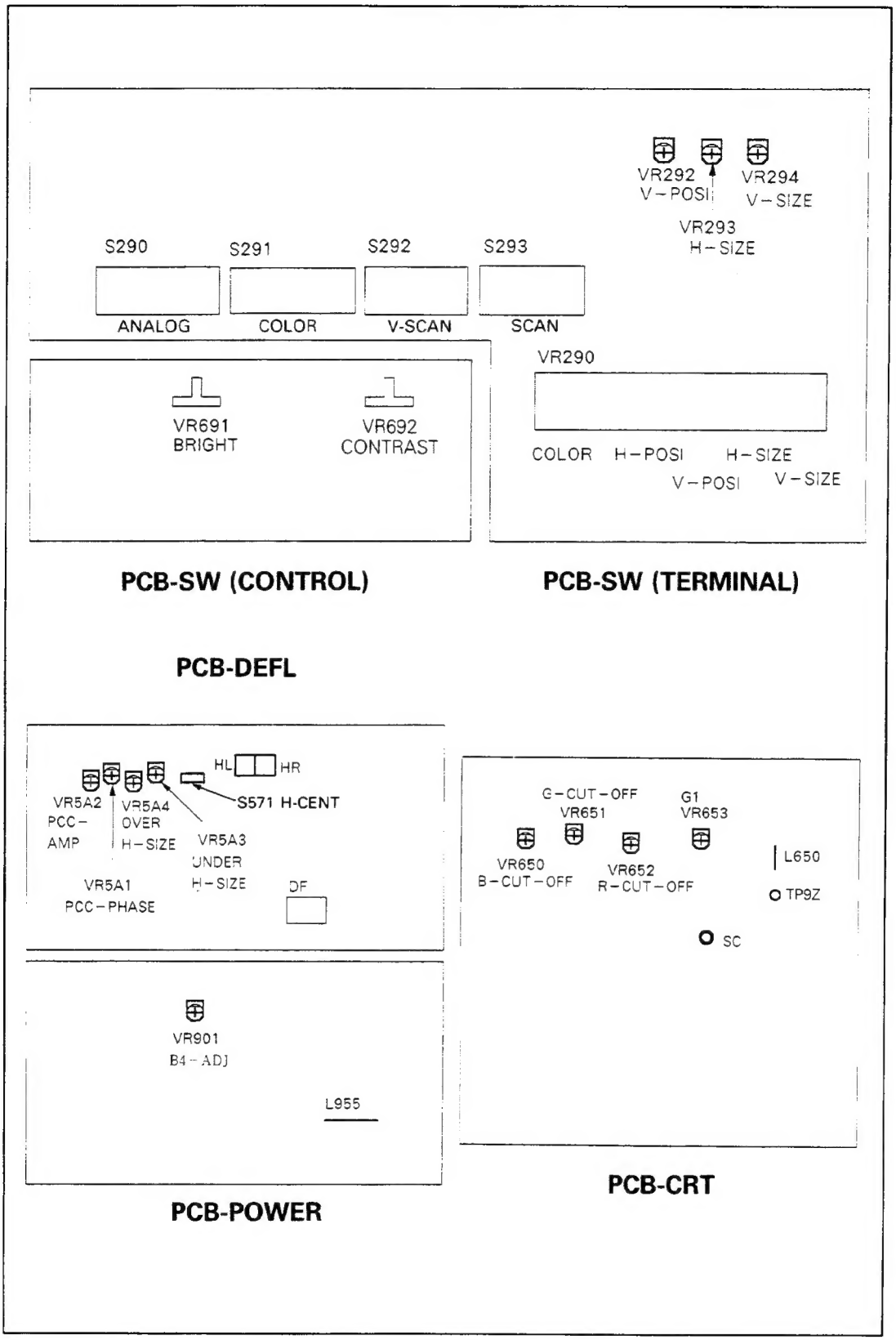
CLAMPER LIST FOR CONNECTOR LEAD

CONNECTOR LEAD	CLAMPER MARK
B1	Ⓛ-Ⓚ-Ⓜ-Ⓠ-Ⓟ
B2	Ⓛ-Ⓚ-Ⓒ
CA	Ⓔ
CV	Ⓓ
DF	Ⓠ
DH	Ⓟ-Ⓠ-Ⓜ
DS	Ⓜ
DV	Ⓞ-Ⓝ-Ⓜ
DY	Ⓐ-Ⓗ
HB	Ⓞ-Ⓝ-Ⓜ
HC	Ⓙ-Ⓚ
HP	Ⓞ-Ⓝ-Ⓜ
LB	Ⓚ
P1	Ⓘ-Ⓙ-Ⓚ
P2	Ⓘ-Ⓙ-Ⓚ
PC	Ⓘ-Ⓙ
PX	Ⓔ
SA	Ⓑ-Ⓒ
VB	Ⓛ-Ⓚ-Ⓕ
Focus-Screen lead	Ⓖ-Ⓓ
Blue lead from CRT-SUB	Ⓒ
Blue lead from PCB-POWER	Ⓘ

LOCATION OF CONTROLS ON PCB

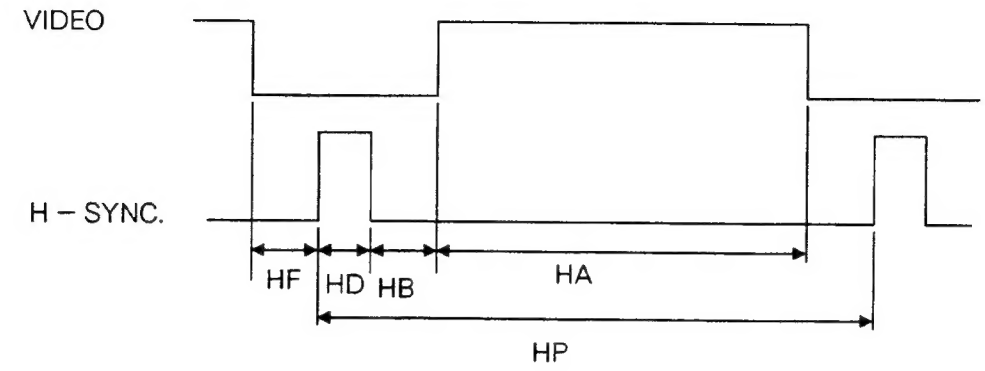


PCB – MAIN

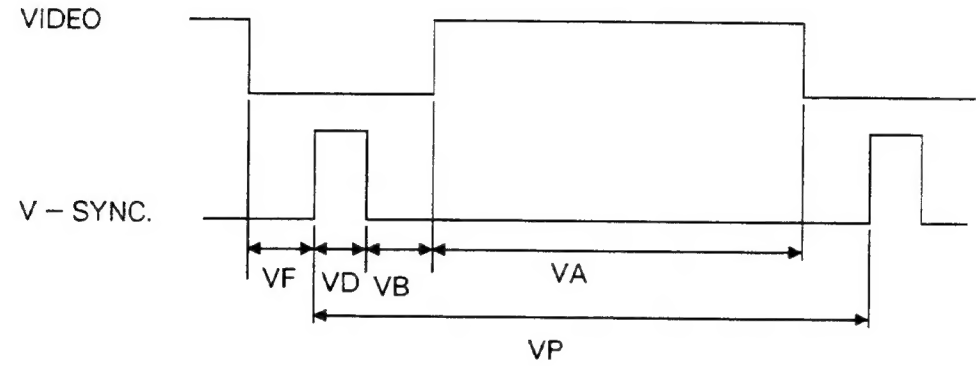

VR292
V-POSI
VR294
V-SIZE
VR293
H-SIZE
S290
S291
S292
S293
ANALOG
COLOR
V-SCAN
SCAN
VR691
BRIGHT
VR692
CONTRAST
VR290
COLOR
H-POSI
H-SIZE
V-POSI
V-SIZE
PCB-SW (CONTROL)
PCB-SW (TERMINAL)
PCB-DEFL
VR5A2
PCC-
AMP
VR5A4
OVER
H-SIZE
VR5A3
UNDER
H-SIZE
VR5A1
PCC-PHASE
HL
HR
S571 H-CENT
DF
G-CUT-OFF
VR651
G1
VR653
VR650
B-CUT-OFF
VR652
R-CUT-OFF
L650
TP9Z
SC
VR901
B4-ADJ
L955
PCB-POWER
PCB-CRT

TIMING CHART

HORIZONTAL



VERTICAL



MODE	Horizontal Timing [μS]					Vertical Timing [mS (H)]					f_H (KHz)	f_V (Hz)
	HP	HF	HD	HB	HA	VP	VF	VD	VB	VA		
CGA	63.78	6.47	4.45	8.03	44.83	16.68	1.640	0.19	2.11	12.740	15.7	60
EGA	45.75	−0.14	4.924	1.65	39.316	16.75	0.044	0.595	0.100	16.011	21.8	59.7
NTSC											15.73	60
PAL											15.625	50
PS/2 480 line (HD: −, VD: −)	31.778	0.636	3.813	1.907	25.42	16.6835	0.3495	0.06356	1.0169	15.2534	31.468	60
PS/2 400 line (HD: −, VD: +)	31.778	0.636	3.813	1.907	25.42	14.2683	0.4131	0.06356	1.0804	12.7112	31.468	70
PS/2 350 line (HD: +, VD: −)	31.778	0.636	3.813	1.907	25.42	14.2683	1.2075	0.06356	1.8749	11.1223	31.468	70
APPLE MAC – II SYNC ON GREEN	28.34	1.79	2.0	3.37	21.18	14.88	0.085	0.085	1.105	13.60	35.28	67

INITIAL SETTING

* Before adjustment, set the following SWs and VRs as shown below. For each VR, select the set adjustment value.

Front panel

VR691 (BRIGHT – VR) ····· centre click
VR692 (CONTRAST – VR) ··· Full clockwise turn (MAX)

Back panel

VR290 (COLOR) ····· Mechanical centre
(H – POSI) ····· centre of screen
(V – POSI) ····· centre of screen
(H – SIZE) ····· 245 mm
(V – SIZE) ····· 186 mm
S290 (signal select switch) (VIDEO/analogue/TTL) ·· TTL
S291 (8/16/AUTO) ····· AUTO
S292 (NOR/AUTO) ····· NOR
S293 (OVER/UNDER) ····· UNDER

PCB – MAIN

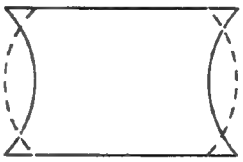
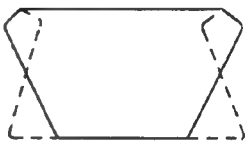
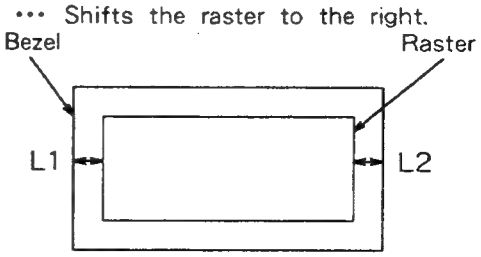
VR201 (SUB – BRT – C) ····· Mechanical centre
VR202 (SUB – CONT – C) ····· Mechanical centre
VR501 (H – POSI – C) ····· Full counterclockwise turn
VR6B0 (DRIVE – B) ····· Full clockwise turn (MAX)
VR6G0 (DRIVE – G) ····· Full clockwise turn (MAX)
VR6X0 (SUB – CONT) ····· Mechanical centre
VR6X1 (SUB – BRT) ····· Mechanical centre
VR761 (HV – ADJ) ····· 45 Percent of turn from full counterclockwise position
VR7F5 (LOW – LIMIT) ····· Full counterclockwise turn

PCB – DEFL

S571 (H – CENT) ····· centre of raster

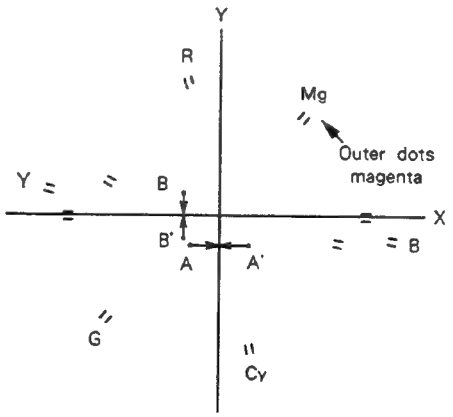
ALIGNMENT PROCEDURE

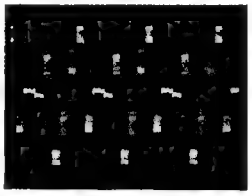
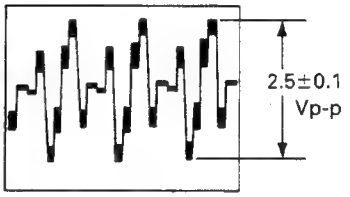
ADJUSTING ITEM	ADJUSTING POINT	ADJUSTING METHOD
Horizontal F – V converter adjustment	VR7F1 VR7F2 VR7F3 VR7F4 (PCB – MAIN)	• Full turn VR7F5 (LOW – LIMIT) counterclockwise. 1. Input the APPLE MAC – II (fh 35.28KHz, fv 67Hz) signal into the analogue terminal. 2. Connect a digital voltmeter between TP33 and GND. Adjust VR7F1 (FV – ADJ) to 9.2 ± 0.05 V. 3. Connect a digital voltmeter between TP33 and TP34. Adjust VR7F2 (FV – 35 – 1) to 0 ± 50 mV. 4. Short the lead between TP8A and TP8B. 5. While watching the screen set VR 7F4 (FV – 35 – 2) where the display synchronizes. 6. Input the CGA signal into the TTL terminal. 7. While watching the screen set VR 7F3 (FV – 15) where the display synchronizes. 8. Remove the lead cable between TP8A and TP8B. 9. If proper synchronism is unavailable after several times of this adjustment, adjust the composite horizontal synchronism.
Vertical F – V converter adjustment	VR701 (PCB – MAIN)	1. Input the CGA (fv = 60Hz) signal into the TTL terminal. 2. Short the lead between TP31 and TP32. 3. Connect the frequency counter between TPfv and GND , then set at 54 ± 1 Hz with VR701 (V – HOLD – R). 4. Remove the lead between TP31 and TP32.
Horizontal sync. of composite	VR7F5 (PCB – MAIN)	※ Carry out this adjustment on completion of the Horizontal F – V converter adjustment. • Full turn VR7F5 (LOW – LIMIT) counterclockwise. 1. Input the composite signal into the VIDEO IN terminal. 2. Short TP8A and TP8B with a lead wire. 3. Connect the frequency counter between TP – fh and GND, then set at 15.625 ± 25 Hz with VR7F5 (LOW – LIMIT). 4. Remove the lead between TP8A and TP8B.
Vertical sync. of composite	VR401 (PCB – MAIN)	1. Input the composite signal into the VIDEO IN terminal. 2. Short the lead between TP31 and TP32. 3. Connect the frequency counter between TP – fh and GND, then set at 45 ± 1 Hz with VR401 (V – HOLD – C). 4. Remove the lead between TP31 and TP32.
B4 adjustment	SCREEN VR (flyback transformer) VR901 (PCB – POWER)	1. Input the total white raster signal of EGA into the TTL terminal. 2. Shift S201 (service SW) to FRONT. (The screen shows one horizontal line.) 3. Set the SCREEN VR (T501) at the point where brightness becomes noticeable. 4. Release S201. 5. Connect a digital voltmeter between L650 (or L955) and ground. Set VR901 at 172 ± 2 V.

ADJUSTING ITEM	ADJUSTING POINT	ADJUSTING METHOD
High – voltage adjustment	VR761 (PCB – MAIN) VR290 (PCB – SW) Connector DF (PCB – DEFL)	※This VR is fixed by bond in factory to prevent unnecessary adjustment. The following steps have to be performed only if an flyback transformer or picture tube is replaced. 1. Input the EGA crosshatch signal into the TTL terminal. 2. Fully turn VR290 (H – SIZE) counterclockwise. 3. Connect a digital voltmeter to connector DF pin ③. Set VR761 (HV – ADJ) at 68 ± 1V. * • Adjust the VR692 (CONTRAST) and T501 (SCREEN VR) to obtain such a brightness that the raster is suppressed and faint signal are seen. •After adjusting VR761 (HV – ADJ), seal the adjustment as to make this adjustment unavailable.
Vertical lineality adjustment	VR290 (V – POSI, V – SIZE) (PCB – SW) VR402 (PCB – MAIN)	1. Input the EGA crosshatch signal into the TTL terminal. 2. Adjust VR290 (V – POSI) to place the image at the centre of bezel. 3. Adjust VR290 (V – SIZE) to make the vertical width 186 mm. 4. Adjust VR402 (V – LIN) to obtain the best crosshatch linearity.
Side – PCC adjustment	VR290 (H – SIZE) (PCB – SW) VR5A1 VR5A2 (PCB – DEFL)	1. Input the PS/2 480 line crosshatch signal into the TTL terminal. 2. Set VR290 (H – SIZE) at the mechanical centre. 3. Adjust VR5A1 (PCC – PHASE) and VR5A2 (PCC – AMP) alternately to straighten both sides.   Function of PCC – AMP (VR5A2) Function of PCC – PHASE (VR5A1) Note) The vertical size in this case is about the correct value. 4. Check that variation is available without any trouble through the turning of VR290 (H – SIZE).
Horizontal width adjustment	BRIGHT (VR691) VR290 (H – POSI, H – SIZE) VR5A3 VR5A4 (PCB – DEFL)	* Before doing this adjustment, complete the "Static Regulation". 1. Input the PS/2 480 line total white raster signal into the TTL terminal. 2. Set the VR691 (BRIGHT) at MAX. 3. Set the raster largely at the centre of bezel by adjusting S571 (H – CENT) switch and selecting connector HL or HR. HL ••• Shifts the raster to the left. HR ••• Shifts the raster to the right.  | L1 – L2 | < 2 mm After the adjustment, the VR691 (BRIGHT) is set to the centre.

ADJUSTING ITEM	ADJUSTING POINT	ADJUSTING METHOD
		4. Adjust VR290 (H – POSI) to centre the horizontal position in the centre of raster. 5. Fully turn VR290 (H – SIZE) counterclockwise. 6. Adjust VR5A3 (UNDER H – SIZE) to make the horizontal width 245 ± 1 mm. 7. Input the CGA total white raster signal. 8. Adjust VR5A4 (OVER H – SIZE) for a horizontal width of 245 ± 1.5 mm.
Vertical width adjustment (Constant vertical width circuit)	VR702 VR703 (PCB – MAIN)	1. Input the EGA total white raster signal into the analogue terminal. 2. Connect a digital voltmeter between TP35 and TP36, then set VR702 (V – BIAS) at 0 ± 0.1 V. 3. Set S292 (V – SCAN) to "AUTO". 4. Adjust VR290 (V – SIZE) to make the vertical size approx. 186 mm. 5. Input PS/2 400 – line signal into the analogue terminal. 6. Adjust VR703 (V – GAIN) to make the vertical size approx. 186 mm. 7. Input the PS/2 480 – line signal into the analogue terminal. 8. Check that the vertical size is about the same as that shown in step 6 above. * If the deviation is 3 mm or larger, repeat steps 4 ~ 6.
Vertical Height adjustment (V – SCAN)	VR290 (V – SIZE) (PCB – SW)	Shift S292 (V – SCAN) to AUTO. Shift S290 (signal select switch) to ANALOG. 1. Input PS/2 480 – line signal in the analogueue terminal. 2. Adjust VR290 (V – SIZE) to make the vertical size 186 ± 1.5 mm. 3. Input the PS/2 400 – line signal. 4. Check that the vertical size is 186 ± 4 mm. 5. Input the PS/2 350 – line signal. 6. Check that the vertical size is 186 ± 4 mm.
Horizontal width adjustment (Composite)	VR290 (PCB – SW)	1. Shift S290 (signal select switch) to VIDEO. 2. Input the colour bar signal into the VIDEO IN terminal. 3. Adjust horizontal size VR293 (TV – H – SIZE) for optimum size. 4. Check that the horizontal side – Pcc is not saturated when the VR691 (BRIGHT) and / or VR692 (CONTRAST) are/is varied.
Vertical position adjustment	VR292 (PCB – SW)	1. Input the colour bar signal into the VIDEO IN terminal. 2. Adjust VR292 (TV – V – POSI) to set the vertical position at the centre.
Vertical width adjustment (Composite)	VR294 (PCB – SW)	1. Input the colour bar signal into the VIDEO IN terminal. 2. Adjust the vertical width with VR294 (TV – V – SIZE) for optimum size.

ADJUSTING ITEM	ADJUSTING POINT	ADJUSTING METHOD
RGB TTL white adjustment	VR650 VR651 VR652 VR653 (PCB – CRT) VR6X1 VR6G0 VR6B0 (PCB – MAIN) SCREEN VR (Flyback transformer)	* Perform the adjustment after minimum of 30 minutes of warm – up running. 1. Shift S290 (signal select switch) to TTL. 2. Input the EGA total white raster signal into the TTL terminal. 3. Set VR650, VR651 and VR652 (R, G, B – CUT – OFF) at full counterclockwise position. 4. Set VR6X1 (SUB – BRT) at the mechanical centre. 5. Fully turn VR6G0 and VR6B0 (G, B – DRIVE) full clockwise. 6. Set VR691 (BRIGHT) at click stop position and VR692 (CONTRAST) at maximum position. 7. Set SCREEN control (Flyback Transformer) at full counterclockwise position. Set VR653 (G1) at clockwise position. 8. Shift S201 (service switch) to FRONT side of the set. (The screen shows one horizontal line.) 9. Adjust SCREEN control (Flyback transformer) until any of the red, blue or green horizontal line appear on the screen. 10. Adjust VR650, VR651 and VR652 (R, G, B – CUT – OFF) to produce a white horizontal line. 11. Release S201. 11. Maintain white by adjusting VR6B0 and VR6G0 (G, B – DRIVE) while watching the screen.
RGB analogue white adjustment		1. Shift S290 (signal select switch) to ANALOG. 2. Input the EGA gray scale of 16 graduations signal into the analogue terminal. 3. Adjust VR6X1 (SUB – BRT) to optimum brightness. Note : Check overall black and white tone through the normal brightness and contrast range. If necessary, repeat steps RGB TTL white adjust 8. to analogue white adjust 3..
RGB beam current adjustment	VR290 (PCB – SW) VR6X0 (PCB – MAIN)	* Start the adjustment after minimum of 30 minutes of warm – up running. 1. Input the EGA total white raster (all intensity : High) into the TTL terminal. 2. Connect connector TP (pin ① : +, pin ④ : –). 3. Fully turn VR290 (H – SIZE) counterclockwise. 4. Set the beam current at 650 ± 20 μA with VR6X0 (SUB – CONT).
Focus adjustment	Focus VR (flyback transformer)	* Start the adjustment after minimum of 30 minutes of warm – up running. 1. Input the EGA total white H – letter signal into the TTL terminal. 2. Control the focus VR, while balancing the focus around the centre of screen, for the best vertical and horizontal H – letter balance and focus. If necessary, readjust the static convergence.

ADJUSTING ITEM	ADJUSTING POINT	ADJUSTING METHOD
Chroma OSC adjustment	VR290 (COLOR) (PCB – SW) VR631 (PCB – MAIN)	1. Shift S290 (signal select switch) to VIDEO. 2. Input the colour bar signal into the VIDEO IN terminal. 3. Set VR290 (COLOR) at the centre. 4. Short TP41 and TP42 with a short lead wire (10 cm or less). 5. Connect R – C 1/4W 270kΩ between TP43 and TP44. 6. Set VR631 (OSC) where colours come out from where no colour comes out. 7. Remove the resistor (R – C 1/4W 270kΩ).
VECTOR adjustment	VR601 (PCB – MAIN)	1. Shift S290 (signal select switch) to VIDEO. 2. Receive a PAL G – card signal. 3. Set the oscilloscope to the X – Y mode. Connect TP46 (B – Y OUT) and TP45 (R – Y OUT) to the oscilloscope horizontal and vertical inputs respectively to display a vector parttern on the screen. 4. Adjust VR291 (COLOR) so that Y axis becomes 3.0 Vp – p. 5. Observing the outermost dots which correspond to normal colour bar, adjust the VR601 (SUB – COLOR) and L633 alternately to almost coincide the double dot pattern equally for all colour points on the scope. 6. Observing around the centre dots, adjust the coil L601 so that the movable points on X axis or Y axis may come up to the nearest points of the centre bright dot. 7. Repeat step 5. and 6. above so that the outer and center dots are converged. 8. Detune L601 so that the movable dots may be shifted and distinguished from the centre bright point. 9. Observing the movable dots, AA' and BB', adjust VR601 (SUB – COLOR) so that the double dots shifted in step 8. may come up to the nearest points X or Y axis. 10. Adjust L633 slightly so that the outermost dots are converged again. 11. If the colour of both sides are prominent slighly sdjust the coil L601 so that the colour of both sides is less on the average. 

ADJUSTING ITEM	ADJUSTING POINT	ADJUSTING METHOD
Chroma level adjustment	VR290 (COLOR) (PCB – SW)	Vector Pattern of G – card Signal 1. Input the colour bar signal into the VIDEO IN terminal. 2. Connect an oscilloscope to TP45. and control VR 290 (COLOR) to secure 2.5 ± 0.1 Vp – p. Setting of oscilloscope Probe : 10 : 1 CH1 : Vertical axis 50 [mV/DIV] DC Horizontal axis 10 [μ sec/DIV]  
Black level beam current adjustment	VR201 VR202 (PCB – MAIN)	* Start the adjustment after minimum of 30 minutes of warm – up running. 1. Input the monoscope signal into the VIDEO IN terminal. 2. Adjust VR201 (SUB – BRT – C) to make black level 10 %. 3. Connect a digital voltmeter to connector TP, and set VR202 (SUB – CONT – C) at 510 ± 20 μ A. * If the black level deviated, repeat steps 2 and 3.
Static regulation adjustment	VR771 (PCB – MAIN)	* Start the adjustment after minimum of 30 minutes of warm – up running and beam current setting. 1. Input the PS/2 480 – line total white raster signal into the analogue terminal. 2. Adjust VR771 (S – REG) to equalize the horizontal width when the VR692 (CONTRAST) is at the maximum level to that when it is at the minimum level. 3. Input the CGA, EGA, and APPLE MAC – II total white signal, and check that the difference in horizontal width between the maximum and minimum CONTRAST levels is 2 mm or less. * If the difference exceeds 2 mm, repeat steps 2 and 3.
CHECK AFTER ADJUSTMENT		**Test of X – radiation protector circuit** **1. Set input signal select switch at the "VIDEO" position. Do not supply video signal.** **2. Turn off the POWER switch.** **3. Connect a 180kΩ – J (R – composite 1/4W) resistor with R761 (Flyback Transformer side) to GND.** **4. Turn on the POWER switch.** **5. Make sure that X – radiation protector has worked .(horizontal oscillation circuit has turned off.)** **6. Turn off the POWER switch.** **7. Remove the resistor (item 3).**

Adjustment in Installation

Purity, Convergence, and Focus Adjustment

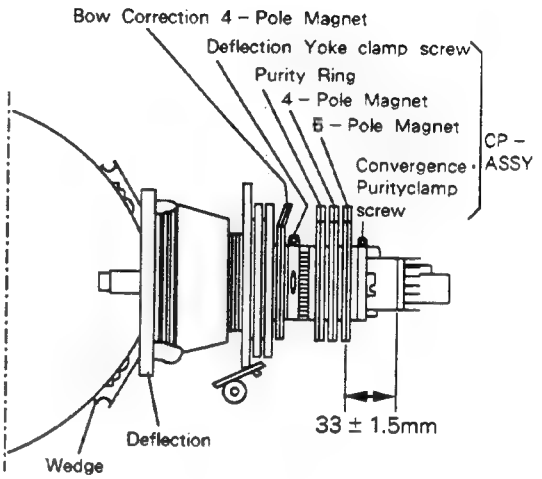
This section is edited in the operating procedure. After replacing the CRT or deflection yoke, perform adjustment in this sequence. For adjustment without part replacement, take necessary steps only.Caution) Start the adjustment after minimum of 30 minutes of warm – up running.

① Removal of deflection yoke, convergence, and purity assemblies

After removing the convergence and purity assemblies from the CRT, remove the wedges. Then, remove the deflection yoke, and adhesive that remained on the CRT.

② Installation of deflection yoke, convergence, and purity assemblies

After fully inserting the new deflection yoke forward, fix the convergence and purity assemblies to the specified positions.
The wedges are installed after completing adjustment of dynamic convergence.



③ Adjustment of degaussing, cut – off, and white balance

1. Demagnetize the front face of CRT, and right and left sides of cabinet with a degaussing coil.
   · Take the specified adjusting procedure.

④ Presetting

1. The bow offsetting 4 – pole magnet close at the vertical position (3 o'clock).

⑤ Rough adjustment of Focus

Roughly adjust to optimize the focus around the range from the centre of screen to the upper left end by using the crosshatch signal.

⑥ Rough adjustment of static convergence

Roughly adjust the static convergence at the centre of screen in accordance with step ⑨.

⑦ Preliminary adjustment of colour purity

1. Set S293 (OVER/UNDER) at "OVER".
2. Set the signal source input at solid colour of green or red (EGA TTL).
3. Display a green (red) ball by loosening the deflection yoke neck tightening screw and pushing the deflection yoke onto the CRT.
4. Adjust the purity ring to position the green (red) ball at the horizontal and vertical centre of the screen.
5. Shift the deflection yoke backward, set it at the intermediate point in the range where the entire screen becomes green (red), then temporarily fix it with a tightening screw, while paying attention to the rotation (horizontalness) of screen.

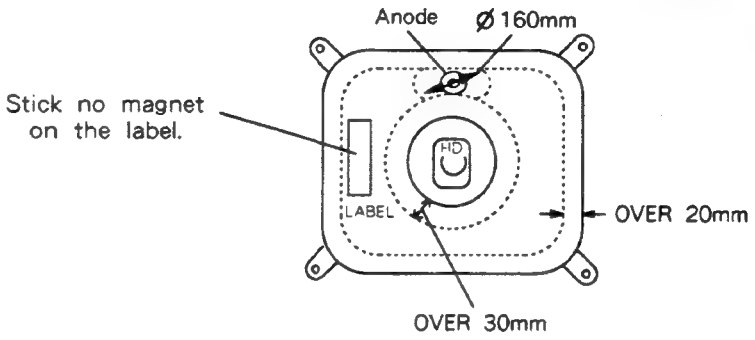
Caution) If any other colour appears, repeat steps 3, 4 and 5.

⑧ Regular adjustment of colour purity

Observe the centre and 4 corners of CRT with a microlens and adjust the deflection yoke and purity ring to eliminate other colour.

Caution) If colour purity is unachievable, offset it by sticking magnets. Then, demagnetize the CRT, check the offset condition, then readjust the purity ring. After completing the adjustment, fix the magnets with tape. After colour purity adjustment, tighten the deflection yoke tightening screw and paint – lock the purity ring. When fixing the deflection yoke, take care not to rotate the raster.

* Magnet: Eliminated from the specifications (461D033020 or 461D002020)



Magnet sticking range (oblique – lined) on CRT neck

⑨ Focus adjustment

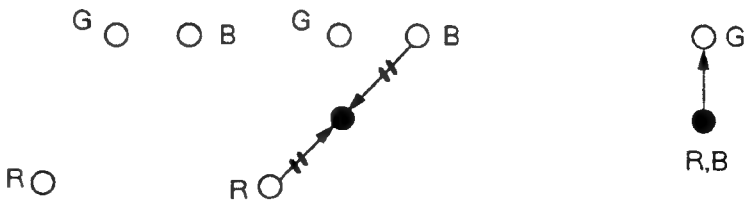
1. Input the EGA crosshatch signal into the TTL terminal.
2. Control the focus VR, while balancing the focus around the centre of screen, for the best vertical and horizontal line balance and focus. If necessary, readjust the static convergence.

Note) After adjusting the ITC, readjust focus and check the static convergence.

⑩ Regular adjustment of static convergence

1. Receive crosshatch signal. Set the BRIGHT control to the centre click, and CONTRAST control at the maximum position.
2. Set UNDERSCAN, and VR290 (H – SIZE) and VR290 (V – SIZE) to secure 250 ± 5 mm of horizontal width and 170 ± 5 mm of vertical width.
3. Adjust the 4 – pole magnet tabs open angle and rotation angle, align both beams "B" and "R" at the centre of screen.
   Note) Input signal are "R" and "B" only.
4. After adding the GREEN signal and adjust the 6 – pole magnet tabs open angle and rotation angle, align the already aligned both side beams "B" and "R" at the centre of screen with central beam "G".
5. If necessary, repeat steps 2 and 3.

Cautions)
* For 4 – pole magnet, both side beams move in opposite directions to each other by the same distance.
* For 6 – pole magnet, both side beams move the same direction by the same distance.
* For 4 – and 6 – pole magnet, the central beam does not shift.



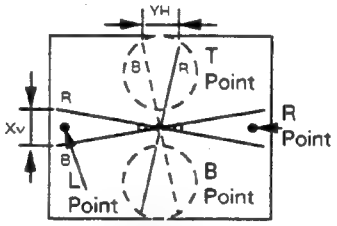
(a) Before adjustment (b) Adjustment with 4 – pole magnet (c) Adjustment with 6 – pole magnet

Example operation of convergence and purity assemblies

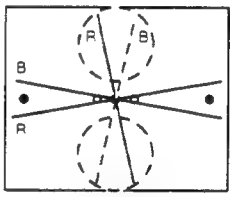
⑪ Adjustment of convergence over entire screen (Deflection yoke swinging)

1. Receive the magenta crosshatch signal.
2. Observe points T and B on the screen, and vertically swing the deflection yoke to align the vertical lines of both – side beams "B" and "R" (to eliminate the horizontal cross) (YH adjustment).
3. Similarly, observe points T and B, and swing the deflection yoke to the right and left to align both – side beam transverse lines (YV adjustment).
4. After completing adjustment steps 2 and 3, insert a wedge into the upper deflection yoke, while making adjustment steps 2 and 3 again.
5. After completing steps 2 and 4, adjust the BOW offset magnet ring in accordance with the "BOW Offsetting Procedure" if there is any Blue – Bow (XV) in the vertical direciton of points L and R through the CRT gun rotation, (deflection yoke fixed).
6. Similarly, if there is faulty convergence such as a crossing (XV) in the vertical direction of points L and R or failure in meeting the raster size (XH) of points L and R due to deviation of deflection yoke axis, adjust the differential coil, and stick a magnetic plate in accordance with the " Procedure taken for axis deviation".
7. After steps 2~6, insert 4 wedges at approx. right angles vertically and horizontally allowing no loosness.
   Wedges are affixed by peeling off the separator on the back.
8. Receive the white crosshatch signal.
9. Check convergence over the screen is satisfactory or balanced. Similarly, set OVERSCAN to check for faulty convergence on the outermost periphery, then fix 4 wedges with silicone rubber (RTV).

Vertical swing (YH adjustment)

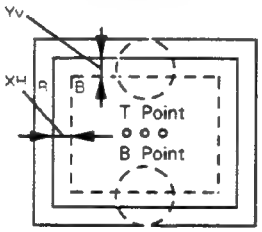


(Upward swing of deflection yoke)

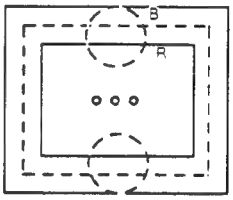


(Downward swing of deflection yoke)

Transverse swing (YV adjustment)



(Deflection yoke swing to the right)



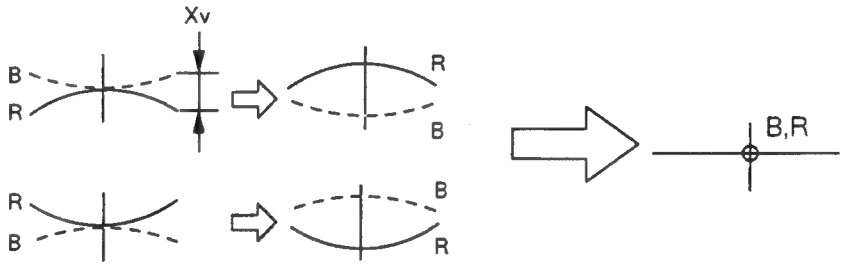
(Deflection yoke swing to the left)

⑫ BOW offset

* Perform the following offset only when any Blue – Bow is noticeable (Check that the deflection yoke has not rotated.)
Receive the magenta crosshatch signal.

1. If there is any Blue – Bow in XV, adjust the deflection yoke Blue – Bow offsetting 4 – pole magnet ring tabs open angle inaccordance with the degree of Bow.
   Caution) In such a case, the line for halving the distance between the two Bow offsetting magnet tabs is on the X – axis in principle. In addition, the maximum opening angle is 90° (0.25~ 0. 3 mm of offset is available) and the opening is in the direction of 3 o'clock (zero offset) viewed from the rear tube when the tabs are closed (see Fig. (b) and (d)).
2. Readjust the static convergence by using the 4 – pole magnet of convergence and purity assemblies. Check that the Blue – Bow disappears. If offset is insufficient or excessive, repeat step 1 above.(see Fig. (c))

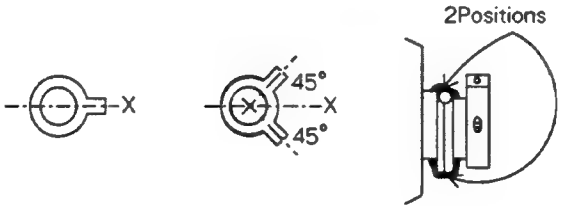
* After completing the adjustment, paint – lock the clearance between the 2 rings and deflection yoke body (2 positions) <see Fig. (d) >.



(a) A Blue Bow is noticeable.

(b) Make deviation once in the reverse direciton to the blue bow with an offsetting magnet ring.

(c) Readjustment ofstatic (upper andlower) convergence with a 4 – pole magnet ring eliminates the Blue Bow.



Zero offset point (opening point angle : 0°)

Maximum offset (opening angle : 90°)

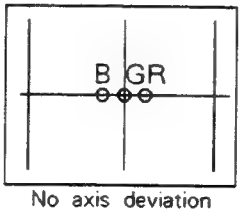
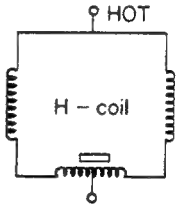
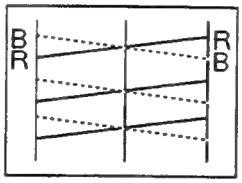
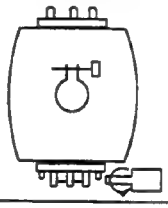
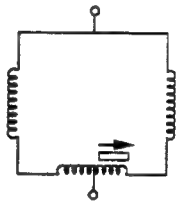
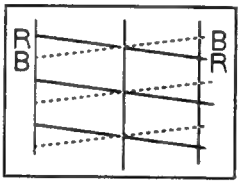
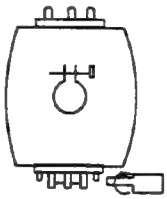
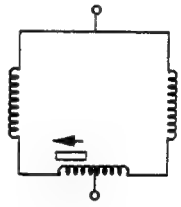
Paint – locking positions

(d) Bend offsetting 4 – pole magnet ring position

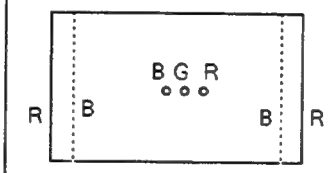
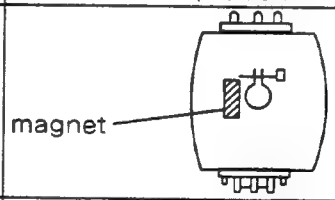
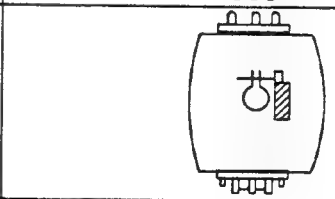
Blue Bow offsetting procedure

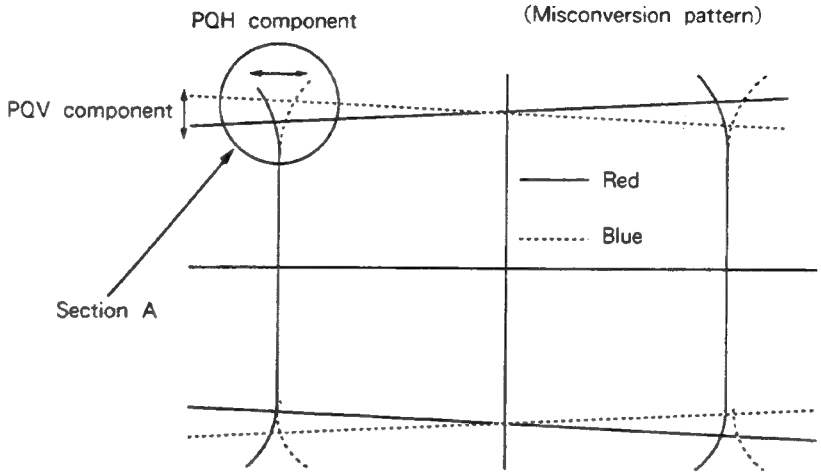
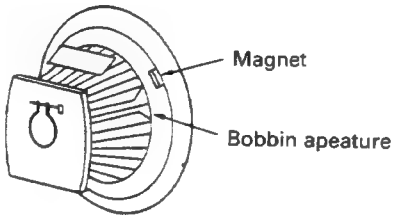
⑬ Axis deviation correcting procedure

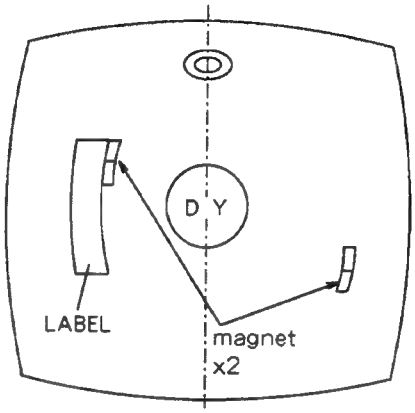
Perform a regular adjustment in accordance with steps 2 and 3 in paragraph ⑪ Adjustment of Convergence on Entire Screen so that YH and YV are adjusted.
For XV adjustment, adjust the horizontal differential coil (core position adjustment), and for XH adjustment, control the magnet – plate.
* This adjustment is unnecessary when no offset is required.
XV adjust :

Type of Misconvergence	core position	Equivalent Circuit
 No axis deviation		
		
		

YV adjust :

Type of Misconvergence	Stick a magnet to the illustrated position
	
	

⑭ Offset of misconversion at corner	If the corner misconversion grade is low, offset it by using a magnet (attached with pressure sensitive adhesive double coated tape 461D017010). Place magnet on the upper deflection yoke bobbin opening, and balance the convergence to minimize the PQH and PQV components. To offset seciton A on the screen, place magnet as Illustrated. * Use one magnet as each corner in principle to prevent distortion.   Magnet sticking position (Rear view of deflection yoke).

⑮ Offset of north – south unbalance of geomagnetism tolerance due to CRT inclination	Attach 4 magnets (461D033020) to the illustrated positions. Attach them by making the N – pole side (marked with a white line) face the CRT funnel. Then, fix them with cotton tape. * Start the offsetting after landing adjustment in principle. Be sure not to cover the CRT label. 
⑯ Part fixing	1. After adjustment, sufficiently fix each tightening screw, and insert a wedge into 3 positions having no anode button at angles of about 120° without allowing any rattling. When nstalling the wedges, apply silicone rubber. Cautions) In this case, convergence must be held under the adjusted condition. Paint – locking is required for the positions so indicated on the assembly drawing.

INPUT SIGNAL SPECIFICATIONS

1. Composite Video Signal.

STANDARD (PAL) video signal.

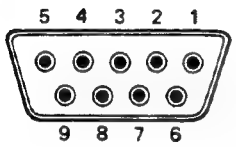
a. Input Level . . . . . 1 V p-p

b. Input Inpedance 75Ω

c. Signal Polarity . . . . . Positive

d. Connector . . . . . BNC type

2. RGB TTL SIGNAL



Connector
D-Sub 9-pin

TABLE(A)

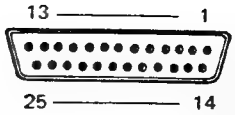
D-Sub 9 Pin Assignments and Signal Levels

	COLOUR GRAPHICS TTL 16 COLOURS	
	Input signal	Polarity
1	GND	
2	Unused	
3	Red video	TTL positive
4	Green video	TTL positive
5	Blue video	TTL positive
6	Intensity	TTL positive
7	Unused	
8	H-sync	TTL positive
9	V-sync	TTL positive

	ENHANCED GRAPHICS TTL 64/16 COLOURS	
	Input signal	Polarity
1	GND	
2	Secondary Red video	TTL positive
3	Primary Red video	TTL positive
4	Primary Green video	TTL positive
5	Primary Blue video	TTL positive
6	Secondary green video/Intensity	TTL positive
7	Secondary blue video	TTL positive
8	H-sync	TTL positive
9	V-sync	TTL negative

	MONOCHROME	
	Input signal	Polarity
1	GND	
2	Unused	
3	Unused	
4	Unused	
5	Unused	
6	High Intensity	TTL positive
7	Video	TTL positive
8	H-sync	TTL positive
9	V-sync	TTL negative

3. RGB ANALOGUE SIGNAL



D-Sub 25 Pin assignment and signal levels.

TABLE(B)

Typical Connecting Samples		Pin No.	Signal	Specification
A	B			
X	X	1	Sync. GND	
X	X	2	Red video	0,6 Vp-p 75 ohms Positive
X	X	3	Red video GND	
X	X	4	Green video	0,6 Vp-p 75 ohms Positive
X	X	5	Green video GND	
	X	6	Superimpose control	Low; 0~0.2 V High; 1~2 V 75 ohms Composite video RGB Analog High speed switching
	X	7	Superimpose GND	
	X	8	Video input select	Low or open; BNC Input video High: Pin 9 Video
	X	9	Comp. video in	1,0 Vp-p 75 ohms Sync. negative
	X	10	Comp. video GND	
	X	11	Comp. video out	1,0 Vp-p 75 ohms Sync. negative
	X	12	Comp. video GND	
X		13	PGA mode control	Low; 400 lines, High or open: 480 lines
X	X	14	Blue video	0,6 Vp-p 75 ohms Positive
X	X	15	Blue video GND	
X	X	16	Horizontal Sync./Comp	TTL level
X	X	17	Vertical Sync.	TTL level
		18	NC	
		19	NC	
		20	NC	
		21	INT	(+5V)
		22	Comp./RGB select	Low; RGB, High or open: composite
		23	Analog/TTL select	Low; TTL, High or open: Analog
		24	Remote	Low; Mode Switch is invalid
		25	GND (shield)	

Notes: 1. For particulars of Typical Connecting Samples, please refer to the Section of "USING THE SPECIAL FEATURES".

2. For using methods of Pins No. 22, 23 and 24, please refer to the Section of "USING THE SPECIAL FEATURES".

USING THE SPECIAL FEATURES

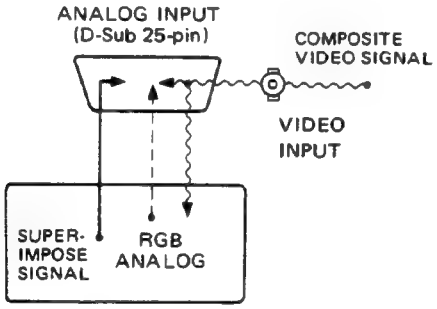
With the following special function equipped, this monitor can be used in versatile ways.

1. Superimpose:

It is possible to superimpose RGB analogue signal on a composite video signal, e.g. VCR, TV Tuner, etc.

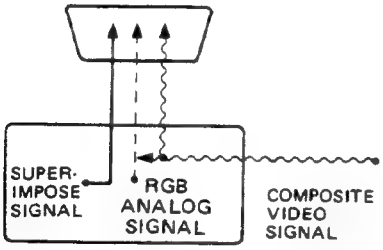
The method is as on the following 2 procedures:

a) Superimpose by feeding the composite video signal to the VIDEO INPUT and adding on thru the 25-pin terminal the RGB analogue signal.



In this case, the composite video signal fed to the VIDEO INPUT and the same signal from Pin 11 of the ANALOG INPUT are used as synchronizing signal for superimposing purposes.

b) Superimpose by inputting both RGB analogue signal and composite video signal from the 25-pin terminal.



In this case, either you short-circuit pins 8 and 21, or elevate pin 8 to high conditions.

Note: Please use the optional (C) cable, Model SC-25F.
Refer to the typical connecting sample "B" on page 26.

2. Remote Control of Input Selecting Signal :

Normally each input signal is selected by means of the INPUT SIGNAL SELECT SWITCH, however, it can be also selected electrically.

In this case, each input signal can be selected by putting Pins No. 22, 23 and 24 of the D-Sub 25-pin Connector in conditions shown in the table below.

D-SUB 25 Pin ASSIGNMENT

Pin No.			SPECIFICATION
22	23	24	
0	0	0	DEPEND ON I.S.S.S.
0	0/G	G	SUPERIMPOSE/COMPOSITE
G	0	G	RGB ANALOGUE
G	G	G	RGB TTL

Note: I.S.S.S → Input Signal Select Switch
0 → OPEN
G → GROUND

PARTS LIST

MODEL : EUM – 1491A

In order to expedite delivery of replacement part orders.

Specify : 1. Model number/Serial number
2. Part number and Description
3. Quantity

Unless full information is supplied, delay in execution of orders will result.

⚠ : Critical components

MARK	B	C	D	F	G	J	K
TOLERANCE (%)	± 0.1	± 0.25	± 0.5	± 1	± 2	± 5	± 10

MARK	M	N	V	X	Z	P	Q
TOLERANCE (%)	± 20	± 30	+ 10 – 10	+ 40 – 20	+ 80 – 20	+ 100 – 0	+ 30 – 10

MARK	B	C	D	F	G
TOLERANCE (pF)	± 0.1	± 0.25	± 0.5	± 1	± 2

SYMBOL NO.	PARTS NO.	PARTS NAME	DESCRIPTION
		TUBES	
⚠ V 291	255B802003	CRT ASSY	AT14A9SRB22-E
		INTEGRATED CIRCUITS	
IC290	263P053020	IC	TC4053BP
IC2A0	266P016010	IC	LA7016
IC2A1	266P016010	IC	LA7016
IC2A2	266P982010	IC	AN608P
IC2A3	266P982010	IC	AN608P
IC2X0	267P011010	IC	STK192
IC2X1	272P027010	IC	AN5862K
IC2X2	272P055010	IC	AN5860
IC401	266P405010	IC	AN5521
IC5A1	272P226010	IC	TDA4950
⚠ IC5X1	267P013010	IC	STR50330
⚠ IC601	266P150010	IC	TA7698AP
⚠ IC6B0	267P103010	IC	STK181B
⚠ IC6G0	267P103010	IC	STK181B
⚠ IC6R0	267P103010	IC	STK181B
IC6X0	272P081010	IC	M51387P
IC701	266P091010	IC	SN74LS221N
IC702	266P844010	IC	SN74LS123N
IC703	263P053020	IC	TC4053BP
IC704	266P419010	IC	M5223P
IC705	266P844010	IC	SN74LS123N
⚠ IC707	266P419030	IC	M5223L
IC709	266P091010	IC	SN74LS221N
IC7F1	272P225010	IC	IR9331
IC7F2	266P419010	IC	M5223P
IC7F3	266P419010	IC	M5223P
IC7M1	266P727010	IC	μPC339C/MC3302P
IC7M2	266P842010	IC	SN74LS42N
IC7M5	266P853020	IC	SN74LS08N
IC7S0	266P478010	IC	SN74LS86N
IC7S1	266P256010	IC	SN74LS09N
IC7S2	266P840020	IC	SN74LS00N
IC7X0	266P468010	IC	SN74LS157N
⚠ IC901	267P921010	IC	STR59041
⚠ IC961	266P932010	IC	NJM7805A/AN7805
⚠ IC971	272P240010	IC	M5237L
		TRANSISTORS	
Q 201	260P419030	TRANSISTOR	2SC2724-D
Q 202	260P419030	TRANSISTOR	2SC2724-D
Q 203	260P419030	TRANSISTOR	2SC2724-D
Q 204	260P455010	TRANSISTOR	DTC124EF
Q 206	260P455010	TRANSISTOR	DTC124EF
Q 207	260P455010	TRANSISTOR	DTC124EF
Q 210	260P560040	TRANSISTOR	2SA933S-S
Q 211	260P582010	TRANSISTOR	2SK656
Q 212	260P560040	TRANSISTOR	2SA933S-S
Q 290	260P455010	TRANSISTOR	DTC124EF
Q 291	260P455010	TRANSISTOR	DTC124EF
Q 292	260P455010	TRANSISTOR	DTC124EF
Q 293	260P455010	TRANSISTOR	DTC124EF
Q 294	260P455010	TRANSISTOR	DTC124EF
Q 2A0	260P455010	TRANSISTOR	DTC124EF
Q 2A1	260P419030	TRANSISTOR	2SC2724-D
Q 2M0	260P139030	TRANSISTOR	2SA564-Q
Q 2M1	260P139030	TRANSISTOR	2SA564-Q
Q 2M2	260P139030	TRANSISTOR	2SA564-Q
Q 2X0	260P416030	TRANSISTOR	2SC2274-F
Q 2X1	260P416030	TRANSISTOR	2SC2274-F
Q 2X2	260P387030	TRANSISTOR	2SC2236-Y
Q 2X3	260P416030	TRANSISTOR	2SC2274-F
Q 2X4	260P455010	TRANSISTOR	DTC124EF
Q 2X5	260P419030	TRANSISTOR	2SC2724-D
Q 2X6	260P254010	TRANSISTOR	2SA1175-E
Q 471	260P418020	TRANSISTOR	2SC2481-O, Y
Q 571	260P422010	TRANSISTOR	2SC2482
⚠ Q 572	260P572010	TRANSISTOR	2SD1556
⚠ Q 573	260P674010	TRANSISTOR	2SK1156
Q 5A1	260P455010	TRANSISTOR	DTC124EF
Q 5A3	260P559010	TRANSISTOR	2SC1740S-Q
Q 5A5	260P455010	TRANSISTOR	DTC124EF
Q 5A6	260P582010	TRANSISTOR	2SK656
Q 5X1	260P469020	TRANSISTOR	2SA1321
⚠ Q 5X2	260P385020	TRANSISTOR	2SC2229-Y
Q 6B0	260P582010	TRANSISTOR	2SK656
Q 6G0	260P582010	TRANSISTOR	2SK656
Q 6R0	260P582010	TRANSISTOR	2SK656
Q 6X0	260P582010	TRANSISTOR	2SK656
Q 6X1	260P582010	TRANSISTOR	2SK656
Q 701	260P560040	TRANSISTOR	2SA933S-S
Q 702	260P560040	TRANSISTOR	2SA933S-S
Q 704	260P455010	TRANSISTOR	DTC124EF
Q 705	260P559010	TRANSISTOR	2SC1740S-Q
Q 706	260P559010	TRANSISTOR	2SC1740S-Q
Q 707	260P455010	TRANSISTOR	DTC124EF
Q 711	260P559010	TRANSISTOR	2SC1740S-Q
Q 712	260P559010	TRANSISTOR	2SC1740S-Q
Q 713	260P455010	TRANSISTOR	DTC124EF
Q 715	260P582010	TRANSISTOR	2SK656
Q 716	260P582010	TRANSISTOR	2SK656
Q 731	260P582010	TRANSISTOR	2SK656
Q 740	260P559010	TRANSISTOR	2SC1740S-Q
Q 7M1	260P455010	TRANSISTOR	DTC124EF
Q 7M5	260P455010	TRANSISTOR	DTC124EF
Q 7M6	260P455010	TRANSISTOR	DTC124EF
Q 7MA	260P455010	TRANSISTOR	DTC124EF
Q 7MB	260P455010	TRANSISTOR	DTC124EF
Q 7MC	260P455010	TRANSISTOR	DTC124EF
Q 7MD	260P632010	TRANSISTOR	DTC124ES
Q 7V1	260P559010	TRANSISTOR	2SC1740S-Q
Q 7V2	260P559010	TRANSISTOR	2SC1740S-Q
⚠ Q 901	260P387030	TRANSISTOR	2SC2236-Y
⚠ Q 902	260P387030	TRANSISTOR	2SC2236-Y
⚠ Q 971	260P464030	TRANSISTOR	2SA940-AB, AC

SYMBOL NO.	PARTS NO.	PARTS NAME	DESCRIPTION
		DIODES	
D 201	264P045040	DIODE	1S2471
D 202	264P045040	DIODE	1S2471
D 203	264P045040	DIODE	1S2471
D 204	264P045040	DIODE	1S2471
D 205	264P045040	DIODE	1S2471
D 210	264P045040	DIODE	1S2471
D 211	264P045040	DIODE	1S2471
D 212	264P045040	DIODE	1S2471
D 213	264P045040	DIODE	1S2471
D 214	264P045040	DIODE	1S2471
D 215	264P045040	DIODE	1S2471
D 216	264P220030	DIODE	MZ306/EQA02-06CDA
D 217	264P460060	DIODE	EQA02-05C
D 220	264P045040	DIODE	1S2471
D 290	264P220010	DIODE	MZ307B
D 291	264P220010	DIODE	MZ307B
D 293	264P220010	DIODE	MZ307B
D 2B0	264P220010	DIODE	MZ307B
D 2G0	264P220010	DIODE	MZ307B
D 2R0	264P220010	DIODE	MZ307B
D 2X0	264P220010	DIODE	MZ307B
D 2X1	264P220010	DIODE	MZ307B
D 2X2	264P220010	DIODE	MZ307B
D 2X3	264P045040	DIODE	1S2471
D 2X4	264P045040	DIODE	1S2471
D 2X5	264P484040	DIODE	RD5.6FB3
D 2X6	264P045040	DIODE	1S2471
D 2X7	264P045040	DIODE	1S2471
D 2X9	264P045040	DIODE	1S2471
D 401	264P285010	DIODE	S5500D/EM 1Z
D 501	264P487080	DIODE	RD12FB2
⚠ D 502	264P045040	DIODE	1S2471
⚠ D 503	264P244020	DIODE	HZT33-02
D 504	264P045040	DIODE	1S2471
D 560	264P285010	DIODE	S5500D/EM 1Z
D 571	264P533010	DIODE	RS 4FS
⚠ D 572	264P102040	DIODE	RU 3M
⚠ D 573	264P102040	DIODE	RU 3M
D 574	264P465080	DIODE	EQA02-13A/RD13EB3
⚠ D 575	264P533010	DIODE	RS 4FS
D 5A1	264P045040	DIODE	1S2471
D 5A2	264P045040	DIODE	1S2471
D 5A3	264P465080	DIODE	EQA02-13A/RD13EB3
D 5A4	264P488020	DIODE	RD13ED1
⚠ D 5X1	264P102020	DIODE	RU 3B
⚠ D 5X2	264P295020	DIODE	TVRIG/ES 1
⚠ D 5X3	264P295020	DIODE	TVRIG/ES 1
D 650	264P295020	DIODE	TVRIG/ES 1
D 651	264P295020	DIODE	TVRIG/ES 1
D 652	264P295020	DIODE	TVRIG/ES 1
D 656	264P295020	DIODE	TVRIG/ES 1
D 691	264P045040	DIODE	1S2471
D 701	264P045040	DIODE	1S2471

SYMBOL NO.	PARTS NO.	PARTS NAME	DESCRIPTION
D 702	264P045040	DIODE	1S2471
D 703	264P045040	DIODE	1S2471
D 710	264P045040	DIODE	1S2471
D 712	264P045040	DIODE	1S2471
D 713	264P045040	DIODE	1S2471
D 714	264P045040	DIODE	1S2471
D 715	264P220060	DIODE	MZ310B/EQA02-10CDA
⚠ D 716	264P484070	DIODE	RD6.2FB2
D 717	264P045040	DIODE	1S2471
D 718	264P045040	DIODE	1S2471
D 719	264P045040	DIODE	1S2471
D 720	264P045040	DIODE	1S2471
D 721	264P045040	DIODE	1S2471
⚠ D 722	264P045040	DIODE	1S2471
D 7F1	264P045040	DIODE	1S2471
D 7F2	264P483080	DIODE	RD5.1FB2
D 7F3	264P483080	DIODE	RD5.1FB2
D 7M1	264P045040	DIODE	1S2471
D 7M2	264P045040	DIODE	1S2471
D 7M3	264P045040	DIODE	1S2471
D 7M4	264P045040	DIODE	1S2471
D 7M5	264P045040	DIODE	1S2471
D 7M6	264P045040	DIODE	1S2471
D 7M7	264P045040	DIODE	1S2471
D 7MA	264P045040	DIODE	1S2471
D 7MC	264P045040	DIODE	1S2471
D 7MD	264P045040	DIODE	1S2471
D 7S0	264P045040	DIODE	1S2471
D 7S1	264P045040	DIODE	1S2471
D 7S2	264P045040	DIODE	1S2471
D 7S3	264P045040	DIODE	1S2471
D 7V1	264P045040	DIODE	1S2471
D 7V2	264P045040	DIODE	1S2471
D 7X0	264P220010	DIODE	MZ307B
D 7X1	264P220010	DIODE	MZ307B
D 7X2	264P220010	DIODE	MZ307B
D 7X3	264P220010	DIODE	MZ307B
⚠ D 901	264P512020	DIODE	RBV-40C
⚠ D 902	264P295020	DIODE	TVRIG/ES 1
⚠ D 903	264P295020	DIODE	TVRIG/ES 1
⚠ D 904	264P295020	DIODE	TVRIG/ES 1
⚠ D 905	264P295020	DIODE	TVRIG/ES 1
⚠ D 906	264P522010	DIODE	RU 1P
⚠ D 951	264P102040	DIODE	RU 3M
⚠ D 952	264P102040	DIODE	RU 3M
⚠ D 953	264P358090	DIODE	RM 4YX
⚠ D 954	264P358090	DIODE	RM 4YX
⚠ D 955	264P102020	DIODE	RU 3B
⚠ D 956	264P102020	DIODE	RU 3B
⚠ D 971	264P045040	DIODE	1S2471
⚠ D 972	264P045040	DIODE	1S2471
⚠ D 991	264P393020	LIGHT EMITTING DIODE	SLC-26GG5F

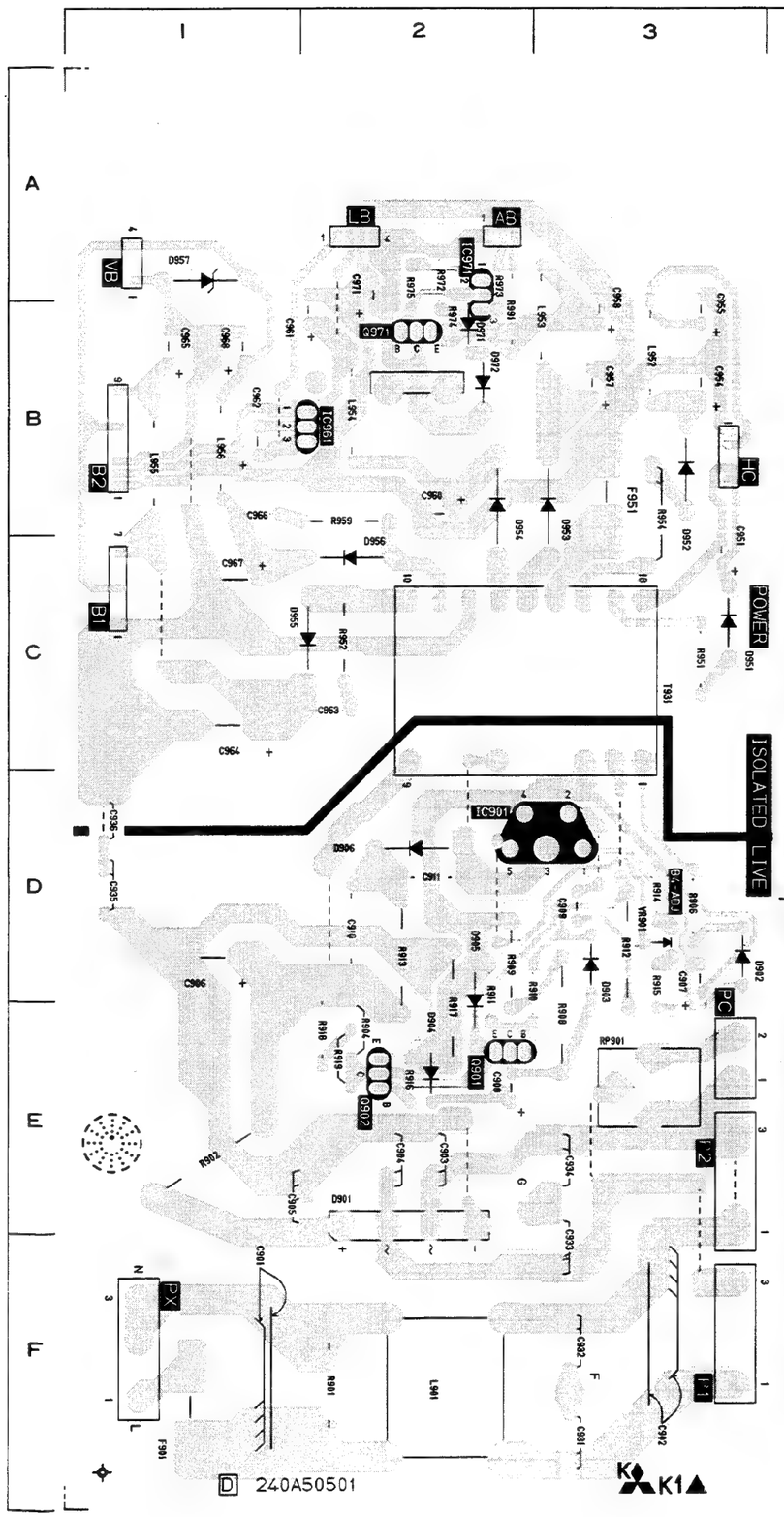
SYMBOL NO.	PARTS NO.	PARTS NAME	DESCRIPTION
		OTHER SEMICONDUCTORS	
⚠ RP901	265P071050	POSITIVE THERMISTOR	PTH451C41BG180N
		DELAY LINES	
DL202	337P099030	DELAY LINE	
DL631	337P090010	DELAY LINE	
		COILS	
	409B062060	DEGAUSSING COIL	
	411D014010	FERRITE CORE FILTER	
L 290	325C120070	PEAKING COIL	3.3μH-K
L 2B0	325C120050	PEAKING COIL	2.2μH-M
L 2B1	325C120050	PEAKING COIL	2.2μH-M
L 2G0	325C120050	PEAKING COIL	2.2μH-M
L 2G1	325C120050	PEAKING COIL	2.2μH-M
L 2R0	325C120050	PEAKING COIL	2.2μH-M
L 2R1	325C120050	PEAKING COIL	2.2μH-M
L 2X0	321C030090	RF COIL	4.7μH-K
⚠ L 491	330P148020	DEFLECTION YOKE COIL	
L 501	325C122010	PEAKING COIL	47μH-K
⚠ L 571	333P018080	H-LIN. COIL	
⚠ L 572	409C054020	S-C COIL	
⚠ L 573	335P006030	H-WIDTH COIL	
L 574	409C055010	P-DRIVE COIL	
L 575	409P152030	FILTER COIL	
L 5X1	351P037010	FILTER COIL	
⚠ L 5X2	351P037010	FILTER COIL	
L 601	349P141020	CHROMA CW COIL	
L 631	325C121090	PEAKING COIL	33MHz
L 632	325C121020	PEAKING COIL	8.2μH-K
L 633	349P141020	CHROMA CW COIL	
L 650	325C110090	PEAKING COIL	4.7μH-K
L 701	325C120070	PEAKING COIL	3.3μH-K
L 702	321C010020	RF COIL	680μH-K
⚠ L 901	351P031010	LINE FILTER	
⚠ L 952	351P037010	FILTER COIL	
⚠ L 953	351P037010	FILTER COIL	
⚠ L 954	351P037010	FILTER COIL	
⚠ L 955	351P037010	FILTER COIL	
⚠ L 956	351P037010	FILTER COIL	
⚠ LC6B1	409P402040	EMI FILTER	
⚠ LC6G1	409P402040	EMI FILTER	
⚠ LC6R1	409P402040	EMI FILTER	
		TRANSFORMERS	
⚠ T 501	334P158010	FLYBACK	
T 571	336P009030	H. DRIVE	
⚠ T 5X1	350P393010	POWER	
⚠ T 931	350P350030	POWER	
		VARIABLE RESISTORS	
VR201	127C080070	VR-SEMIFIXED	1/5W B5KΩ-M
VR202	127C081010	VR-SEMIFIXED	1/5W B50KΩ-M
VR290	129C127040	VR-BLOCK	B30KX5
VR292	127C081000	VR-SEMIFIXED	1/5W B30KΩ-M
VR293	127C081000	VR-SEMIFIXED	1/5W B30KΩ-M
VR294	127C081000	VR-SEMIFIXED	1/5W B30KΩ-M
VR401	127C081040	VR-SEMIFIXED	1/10W 300K
VR402	127C081020	VR-SEMIFIXED	1/5W B100KΩ-M
VR501	127C080080	VR-SEMIFIXED	1/5W B10KΩ-M
VR5A1	127C180080	VR-SEMIFIXED	1/10W B10KΩ-M
VR5A2	127C181030	VR-SEMIFIXED	1/5W B200KΩ-M
VR5A3	127C181020	VR-SEMIFIXED	1/5W B100KΩ-M
VR5A4	127C180080	VR-SEMIFIXED	1/10W B10KΩ-M
VR601	127C080050	VR-SEMIFIXED	1/5W B2KΩ-M
VR631	127C080070	VR-SEMIFIXED	1/5W B5KΩ-M
VR650	127C030090	VR-SEMIFIXED	1/5W B20KΩ-N
VR651	127C030090	VR-SEMIFIXED	1/5W B20KΩ-N
VR652	127C030090	VR-SEMIFIXED	1/5W B20KΩ-N
VR653	127C031010	VR-SEMIFIXED	1/5W B50KΩ-N
VR691	129D112030	VR-PCB	0.15W B5KΩ-15S
VR692	129D112020	VR-PCB	0.15W B5KΩ-15S
VR6B0	127C080090	VR-SEMIFIXED	1/5W B20KΩ-M
VR6G0	127C080090	VR-SEMIFIXED	1/5W B20KΩ-M
VR6X0	127C080080	VR-SEMIFIXED	1/5W B10KΩ-M
VR6X1	127C090080	VR-SEMIFIXED	1/5W B10KΩ-M
VR701	127C080080	VR-SEMIFIXED	1/5W B10KΩ-M
VR702	127C080080	VR-SEMIFIXED	1/5W B10KΩ-M
VR703	127C080090	VR-SEMIFIXED	1/5W B20KΩ-M
⚠ VR761	129D130060	VR-SEMIFIXED	1/4W B300KΩ-M
VR771	127C081030	VR-SEMIFIXED	1/10W B200KΩ-N
VR7F1	127C080080	VR-SEMIFIXED	1/5W B10KΩ-M
VR7F2	127C080060	VR-SEMIFIXED	1/5W B3KΩ-M
VR7F3	127C080090	VR-SEMIFIXED	1/5W B20KΩ-M
VR7F4	127C080080	VR-SEMIFIXED	1/5W B10KΩ-M
VR7F5	127C080070	VR-SEMIFIXED	1/5W B5KΩ-M
⚠ VR901	127C081020	VR-SEMIFIXED	1/5W B100KΩ-M
		RESISTORS	
⚠ R 415	103P378040	FUSE	1/4W 2.2Ω-J
⚠ R 510	103P378040	FUSE	1/4W 2.2Ω-J
R 582	103P391030	FUSE	1/2W 100Ω-J
⚠ R 5AM	103P398000	FUSE	1/2W 1.0Ω-J
⚠ R 5AN	103P398040	FUSE	1/2W 2.2Ω-J
R 5XC	102P082090	CEMENT WIRE	10W 10Ω
⚠ R 661	103P438080	FUSE METAL	2W 4.7Ω-K/J
R 7MF	103P543070	NETWORK	1/8W 10KΩ-JX4
⚠ R 902	102P081040	CEMENT WIRE	7W 4.7Ω-K
⚠ R 906	103P370080	FUSE	1/4W 39Ω-J
⚠ R 951	103P378000	FUSE	1/4W 1.0Ω-J
⚠ R 954	103P378000	FUSE	1/4W 1.0Ω-J
		CAPACITORS AND TRIMMERS	
⚠ C 5X5	185D052010	ELECTROLYTIC-C	180V 220μF-H-Q
⚠ C 906	185D056040	ELECTROLYTIC-C	H400V 330μF-M
		SWITCHES	
	432P053030	PUSH SWITCH	
S 201	129P007090	VR-CH-PRESETTER	SW-BAND

SYMBOL NO.	PARTS NO.	PARTS NAME	DESCRIPTION
S 290	431C081010	SLIDE SWITCH	
S 291	431C081010	SLIDE SWITCH	
S 292	431C082010	SLIDE SWITCH	
S 293	431C082010	SLIDE SWITCH	
S 571	129P007090	VR-CH-PRESETTER	SW-BAND
		MISCELLANEOUS	
	338P032010	CPM ASSY	
⚠	451D046010	AC POWER JACK(3P)	
⚠	449C081010	CRT SOCKET	
	641D758010	WEDGE	
⚠ AG651	224P001010	AIR-GAP	DSP-301N
⚠ AG6R1	224P001010	AIR-GAP	DSP-301N
⚠ AG6G1	224P001010	AIR-GAP	DSP-301N
⚠ AG6B1	224P001010	AIR-GAP	DSP-301N
⚠ F 901	283D024060	FUSE	3.15A-T
⚠ F 951	283D024060	FUSE	3.15A-T
⚠ PC571	268P033010	PHOTO COUPLER	ON3161-R
X 601	285P011010	CRYSTAL RESONATOR	4.434MHz
		PRINTED CIRCUIT BOARD ASSY'S	
⚠	930C232010	CRT PCB ASSY	
⚠	920D309010	DEFL PCB ASSY	
⚠	930B437006	MAIN PCB ASSY	
⚠	920D281010	POWER PCB ASSY	
	930C231020	SW PCB ASSY	
		MECHANICAL PARTS	
	669D221040	SCREW	SCREW-TB(10P)
	669D221080	SCREW	4X25(10P)
	669D212010	SCREW	(10P)
	669D212020	SCREW	D=3 L=8 83A
	700B103050	BASE UNIT	
		COSMETIC PARTS	
⚠	242C795090	AC POWER CORD	
⚠	700C117060	BACK COVER ASSY	
	761D494010	BUTTON POWER	
⚠	701A374050	FRONT PANEL	
	761D495010	VR KNOB	
		PACKING PARTS AND ACCESSORY	
	803A185010	PACKING CUSHION	MO-13
	871C244070	INSTRUCTION BOOK	
	831C061010	PACKING BAG	
	801C045090	PACKING CASE	

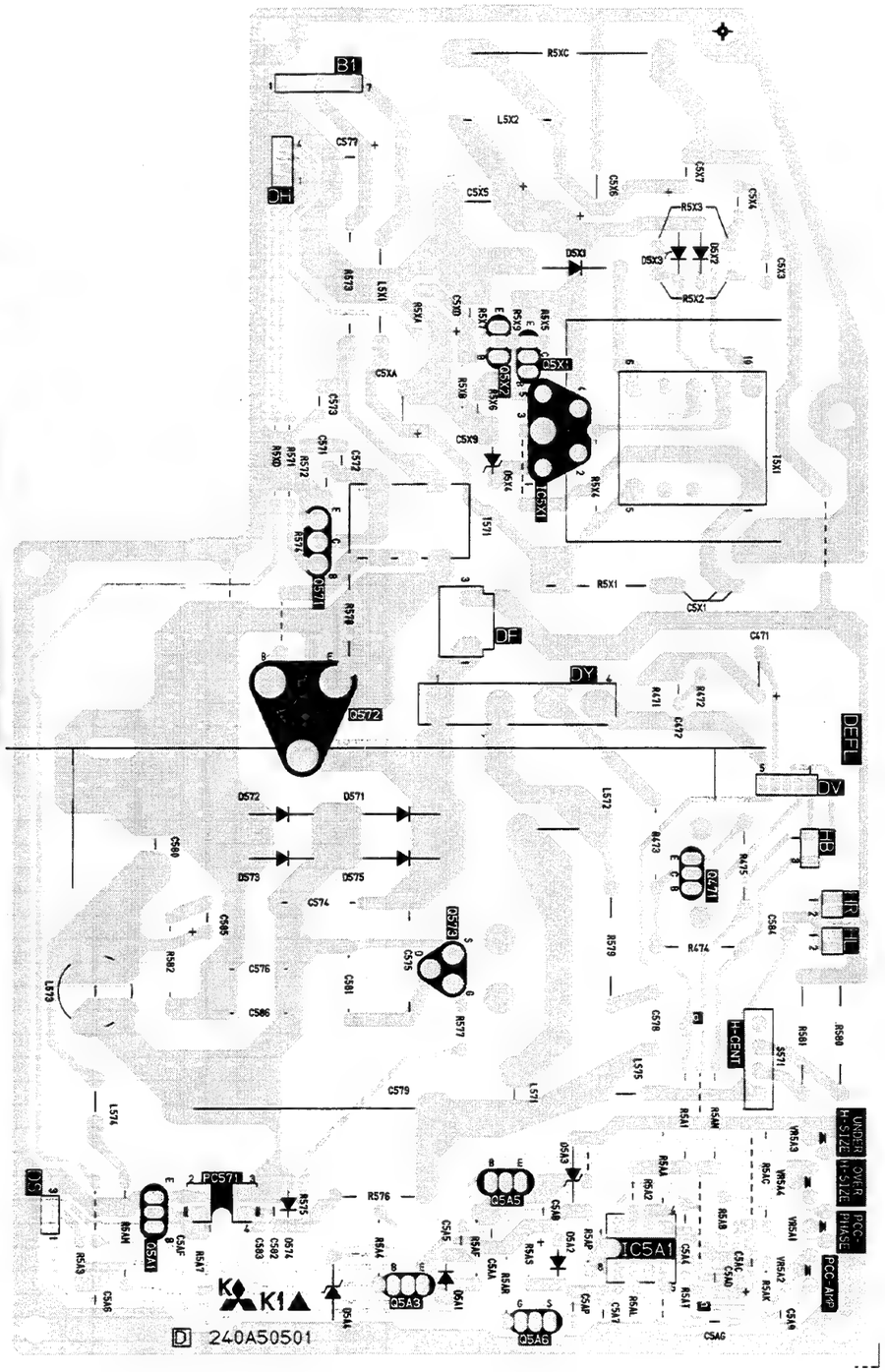
SYMBOL NO.	PARTS NO.	PARTS NAME	DESCRIPTION
		OTHER CRITICAL COMPONENTS	
⚠ C 530	181P205010	C-ELECTROLYTIC	50V 1μF-M
⚠ C 574	172P170020	C-M-PLASTIC-PP	1600V 1200pF-J
⚠ C 575	172P171020	C-M-PLASTIC-PP	1600V 8200pF-J
⚠ C 576	172P088000	C-PLASTIC-PP	630V 0.012μF-J
⚠ C 578	154P251080	C-CERAMIC	R2KV 1000pF-K
⚠ C 579	189P102040	C-M-PLASTIC-PP	200V 5.6μF-J
⚠ C 580	189P026030	C-ELECTROLYTIC-BP	50V 22μF-M
⚠ C 581	172P088000	C-PLASTIC-PP	630V 0.012μF-J
⚠ C 586	172P082080	C-PLASTIC-PP	630V 560pF-J
⚠ C 760	142P021070	C-CERAMIC	B50V 4700pF-K
⚠ C 761	181P142030	C-ELECTROLYTIC-NP	16V 10μF-M
⚠ C 901	189P103060	C-M-POLYESTER-AC	AC250V 0.47μF-M
⚠ C 902	189P103060	C-M-POLYESTER-AC	AC250V 0.47μF-M
⚠ C 903	189P067050	C-CERAMIC-AC	F VA1 2200pF-M
⚠ C 904	189P067050	C-CERAMIC-AC	F VA1 2200pF-M
⚠ C 905	189P067050	C-CERAMIC-AC	F VA1 2200pF-M
⚠ C 907	181P187040	C-ELECTROLYTIC	100V 10μF-M 105° C
⚠ C 908	181P183010	C-ELECTROLYTIC	25V 100μF-M 105° C
⚠ C 909	172P165050	C-TF	50V 0.022μF-J
⚠ C 910	172P087070	C-PLASTIC-PP	630V 0.047μF-J
⚠ C 911	154P251080	C-CERAMIC	R2KV 1000pF-K
⚠ C 931	189P067050	C-CERAMIC-AC	F VA1 2200pF-M
⚠ C 932	189P067050	C-CERAMIC-AC	F VA1 2200pF-M
⚠ C 935	189P067050	C-CERAMIC-AC	F VA1 2200pF-M
⚠ C 936	189P067050	C-CERAMIC-AC	F VA1 2200pF-M
⚠ C 951	181P201070	C-ELECTROLYTIC	10V 470μF-M
⚠ C 954	181P204090	C-ELECTROLYTIC	35V 470μF-M
⚠ C 955	181P204060	C-ELECTROLYTIC	35V 100μF-M
⚠ C 957	181P203080	C-ELECTROLYTIC	25V 1000μF-M
⚠ C 958	181P203060	C-ELECTROLYTIC	25V 330μF-M
⚠ C 960	181P202080	C-ELECTROLYTIC	16V 1000μF-M
⚠ C 961	181P352070	C-ELECTROLYTIC	16V 470μF-M
⚠ C 962	181P203030	C-ELECTROLYTIC	25V 47μF-M
⚠ C 964	181P192090	C-ELECTROLYTIC	200V 100μF-M/Q
⚠ C 965	181P192050	C-ELECTROLYTIC	200V 10μF-M/Q
⚠ C 967	181P191030	C-ELECTROLYTIC	160V 100μF-M/Q
⚠ C 968	181P191000	C-ELECTROLYTIC	160V 22μF-M/Q
⚠ C 971	181P203060	C-ELECTROLYTIC	25V 330μF-M
⚠ C 991	189P027040	C-CERAMIC-AC	B VA1 1000pF-K
⚠ C 992	189P027040	C-CERAMIC-AC	B VA1 1000pF-K
⚠ C 5X1	154P251080	C-CERAMIC	R2KV 1000pF-K
⚠ C 5X3	172P165050	C-TF	50V 0.022μF-J
⚠ C 5X4	172P167050	C-TF	50V 1μF-J
⚠ C 5X6	181P192090	C-ELECTROLYTIC	200V 100μF-M/Q
⚠ C 5X7	189D133010	C-ELECTROLYTIC	50V 22μF-M 105° C
⚠ C 5X9	172P165050	C-TF	50V 0.022μF-J
⚠ C 5XD	181P205060	C-ELECTROLYTIC	50V 22μF-M

SYMBOL NO.	PARTS NO.	PARTS NAME	DESCRIPTION
⚠ R 429	103P413010	R-CARBON	1/4W 3.3KΩ-J
⚠ R 530	103P463030	R-METAL	1/4W 2.2KΩ-F
⚠ R 531	103P463070	R-METAL	1/4W 3.3KΩ-F
⚠ R 760	101P103D30	R-COMPOSITION	1/2W 10KΩ-K
⚠ R 761	103P415050	R-CARBON	1/4W 330KΩ-J
⚠ R 765	103P413030	R-CARBON	1/4W 4.7KΩ-J
⚠ R 766	103P411030	R-CARBON	1/4W 100Ω-J
⚠ R 767	103P414090	R-CARBON	1/4W 100KΩ-J
⚠ R 772	103P413030	R-CARBON	1/4W 4.7KΩ-J
⚠ R 901	109D031090	R-COMPOSITION	1/2W 470KΩ-J
⚠ R 908	103C190080	R-METAL	3W 39Ω-J
⚠ R 909	103C180060	R-METAL	2W 27Ω-J
⚠ R 910	103P412050	R-CARBON	1/4W 1KΩ-J
⚠ R 911	103P412050	R-CARBON	1/4W 1KΩ-J
⚠ R 912	103C190070	R-METAL	3W 33Ω-J
⚠ R 913	103C194070	R-METAL	3W 68Ω-J
⚠ R 914	103P415040	R-CARBON	1/4W 270KΩ-J
⚠ R 915	103P414010	R-CARBON	1/4W 22KΩ-J
⚠ R 916	103P410070	R-CARBON	1/4W 33Ω-
⚠ R 917	103C197040	R-METAL	3W 0.33Ω-J
⚠ R 918	103P415030	R-CARBON	1/2W 220KΩ-J
⚠ R 919	103P415030	R-CARBON	1/2W 220KΩ-J
⚠ R 972	103P466050	R-METAL	1/4W 47KΩ-F
⚠ R 973	103P464030	R-METAL	1/4W 5.6KΩ-F
⚠ R 974	103P411070	R-CARBON	1/4W 220Ω-J
⚠ R 975	103P412010	R-CARBON	1/4W 470Ω-J
⚠ R 5X1	103C190070	R-METAL	3W 33Ω-J
⚠ R 5X2	103C170030	R-METAL	1W 15Ω-J
⚠ R 5X3	103C171060	R-METAL	1W 180Ω-J
⚠ R 5X5	103P413070	R-CARBON	1/4W 10KΩ-J
⚠ R 5X7	103P413020	R-CARBON	1/4W 3.9KΩ-J
⚠ R 5X9	103P414000	R-CARBON	1/4W 18KΩ-J
⚠ R 5XA	103P412050	R-CARBON	1/4W 1KΩ-J
⚠ R 5XB	103P413070	R-CARBON	1/4W 10KΩ-J
⚠ R 5XC	102P082090	R-CEMENT-WIRE	10W 10Ω-K/J

SYMBOL NO.	PARTS NO.	PARTS NAME	DESCRIPTION



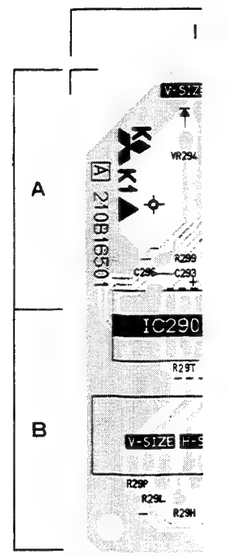
PCB-POWER

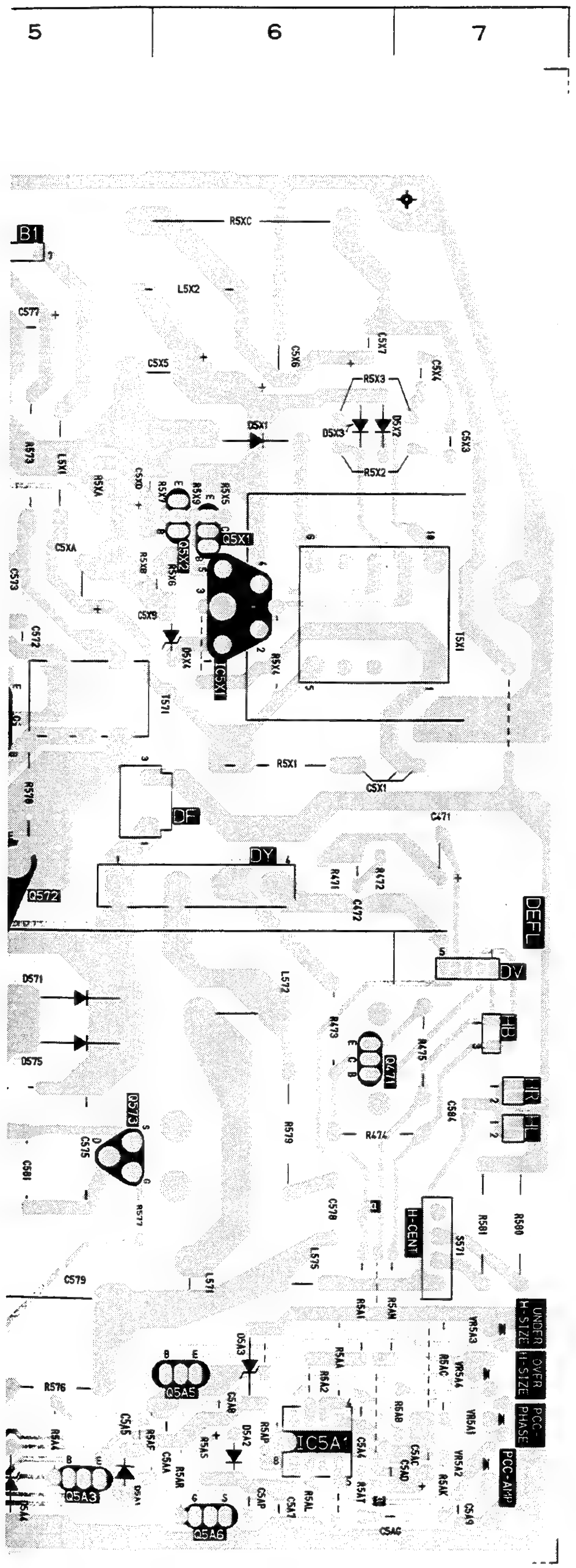


PCB-DEFL

SYMBOL NO.	ADDRESS
D571	D- 5
D572	D- 5
D573	E- 5
D574	F- 5
D575	E- 5
D5A1	F- 5
D5A2	F- 6
D5A3	F- 6
D5A4	G- 5
D5X1	B- 6
D5X2	B- 7
D5X3	B- 6
D5X4	C- 6
D901	E- 2
D902	D- 4
D903	E- 3
D904	E- 2
D905	D- 2
D906	D- 2
D951	C- 3
D952	C- 3
D953	C- 3
D954	C- 2
D955	C- 1
D956	C- 2
D957	A- 1
D971	B- 2
D972	B- 2
F901	G- 1
F951	B- 3
IC5A1	F- 6
IC5X1	C- 6
IC901	D- 2
IC961	B- 2
IC971	A- 2

SYMBOL NO.	ADDRESS
L571	F- 6
L572	D- 6
L573	E- 4
L574	F- 4
L575	F- 6
L5X1	B- 5
L5X2	A- 6
L901	F- 2
L952	B- 3
L953	B- 3
L954	B- 2
L955	B- 1
L956	B- 1
Q471	E- 7
Q571	D- 5
Q572	D- 5
Q573	E- 5
Q5A1	F- 4
Q5A3	F- 5
Q5A5	F- 6
Q5A6	G- 6
Q5X1	C- 6
Q5X2	C- 6
Q901	E- 2
Q902	E- 2
Q971	B- 2
VR5A1	F- 7
VR5A2	F- 7
VR5A3	F- 7
VR5A4	F- 7
VR901	D- 3

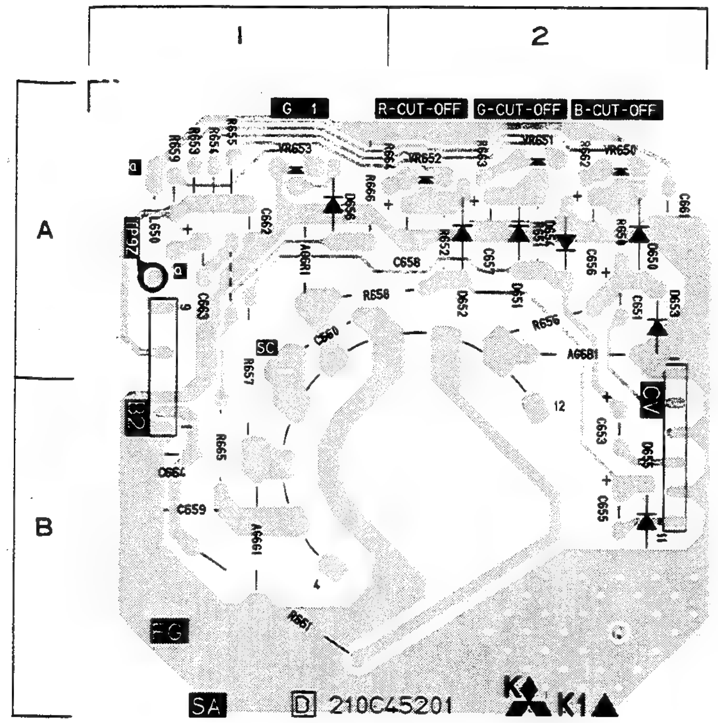




PCB-DEFL

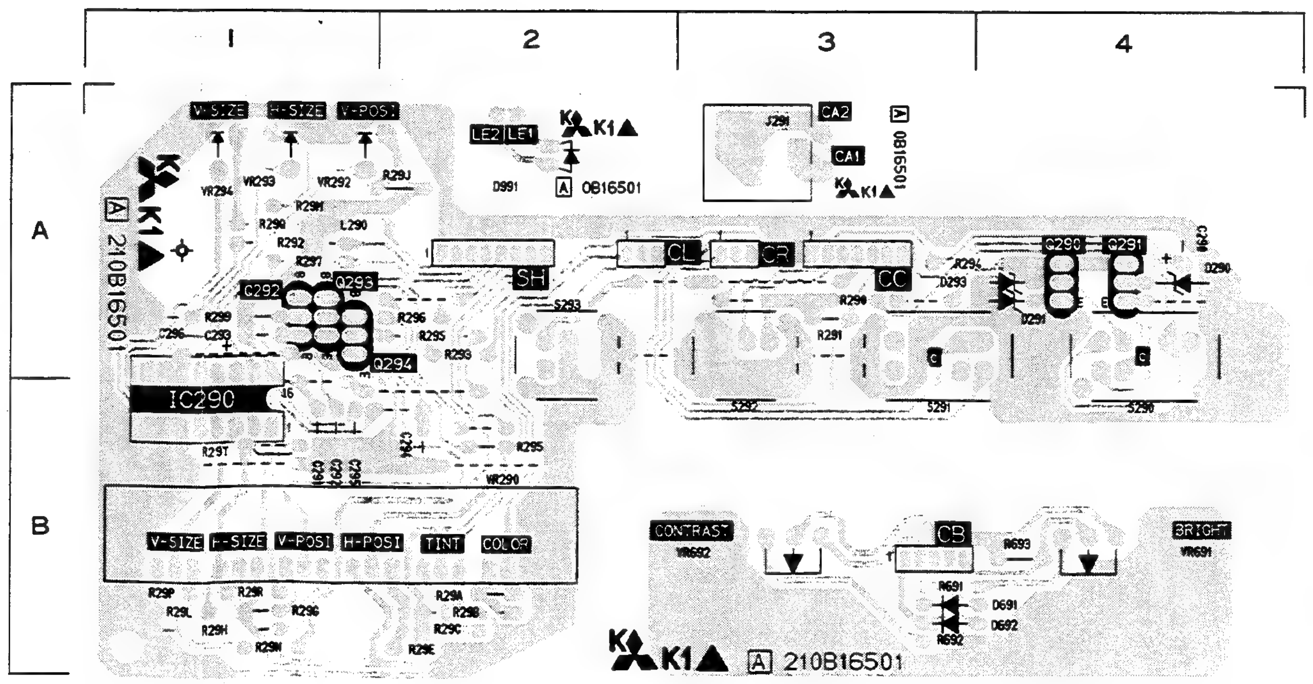
SYMBOL NO.	ADDRESS
D571	D- 5
D572	D- 5
D573	E- 5
D574	F- 5
D575	E- 5
D5A1	F- 5
D5A2	F- 6
D5A3	F- 6
D5A4	G- 5
D5X1	B- 6
D5X2	B- 7
D5X3	B- 6
D5X4	C- 6
D901	E- 2
D902	D- 4
D903	E- 3
D904	E- 2
D905	D- 2
D906	D- 2
D951	C- 3
D952	C- 3
D953	C- 3
D954	C- 2
D955	C- 1
D956	C- 2
D957	A- 1
D971	B- 2
D972	B- 2
F901	G- 1
F951	B- 3
IC5A1	F- 6
IC5X1	C- 6
IC901	D- 2
IC961	B- 2
IC971	A- 2

SYMBOL NO.	ADDRESS
L571	F- 6
L572	D- 6
L573	E- 4
L574	F- 4
L575	F- 6
L5X1	B- 5
L5X2	A- 6
L901	F- 2
L952	B- 3
L953	B- 3
L954	B- 2
L955	B- 1
L956	B- 1
Q471	E- 7
Q571	D- 5
Q572	D- 5
Q573	E- 5
Q5A1	F- 4
Q5A3	F- 5
Q5A5	F- 6
Q5A6	G- 6
Q5X1	C- 6
Q5X2	C- 6
Q901	E- 2
Q902	E- 2
Q971	B- 2
VR5A1	F- 7
VR5A2	F- 7
VR5A3	F- 7
VR5A4	F- 7
VR901	D- 3



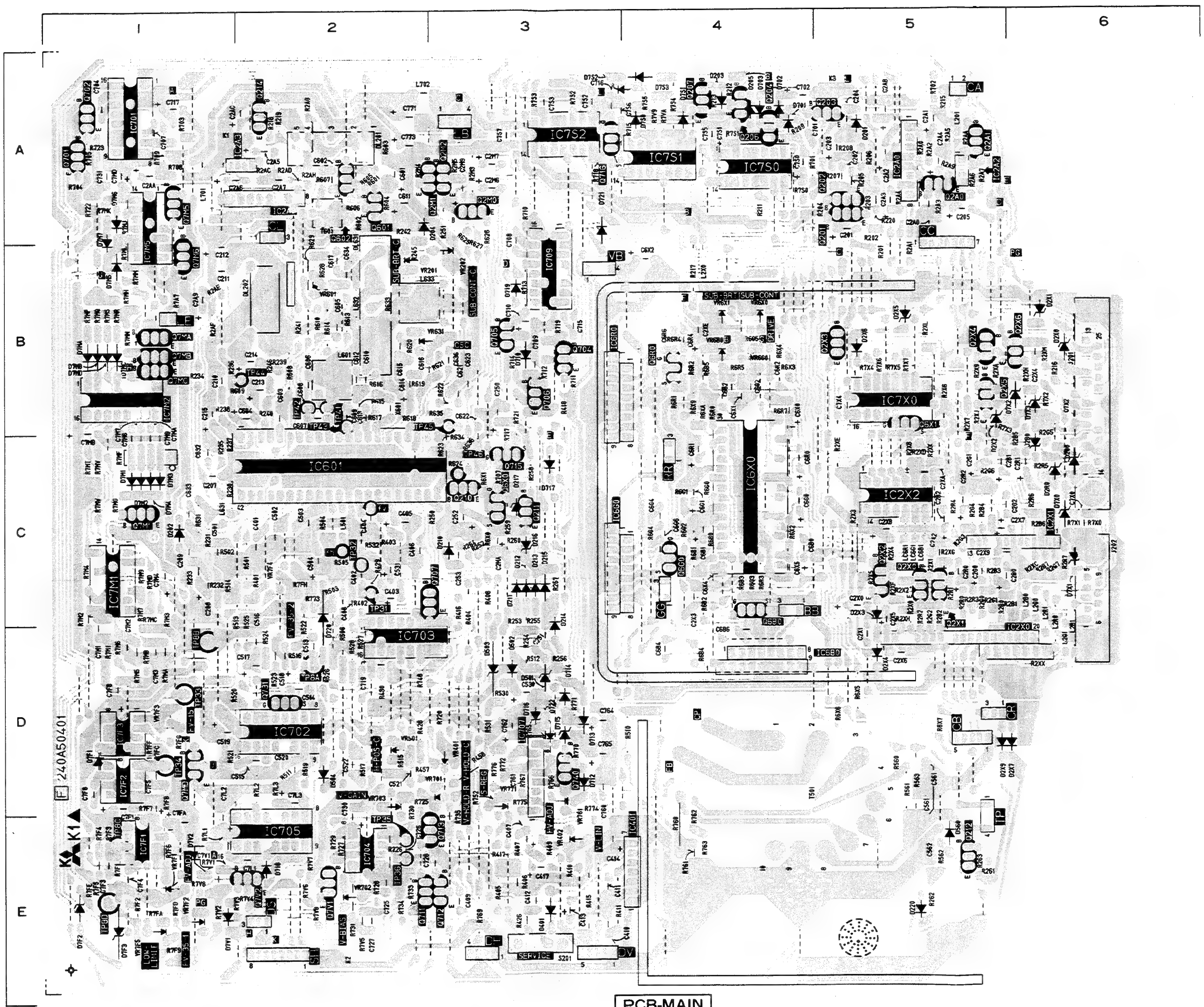
PCB-CRT

SYMBOL NO.	ADDRESS
D650	A- 2
D651	A- 2
D652	A- 2
D653	A- 2
D654	A- 2
D655	B- 2
D656	A- 1
L650	A- 1
TP9Z	A- 1
VR650	A- 2
VR651	A- 2
VR652	A- 2
VR653	A- 1



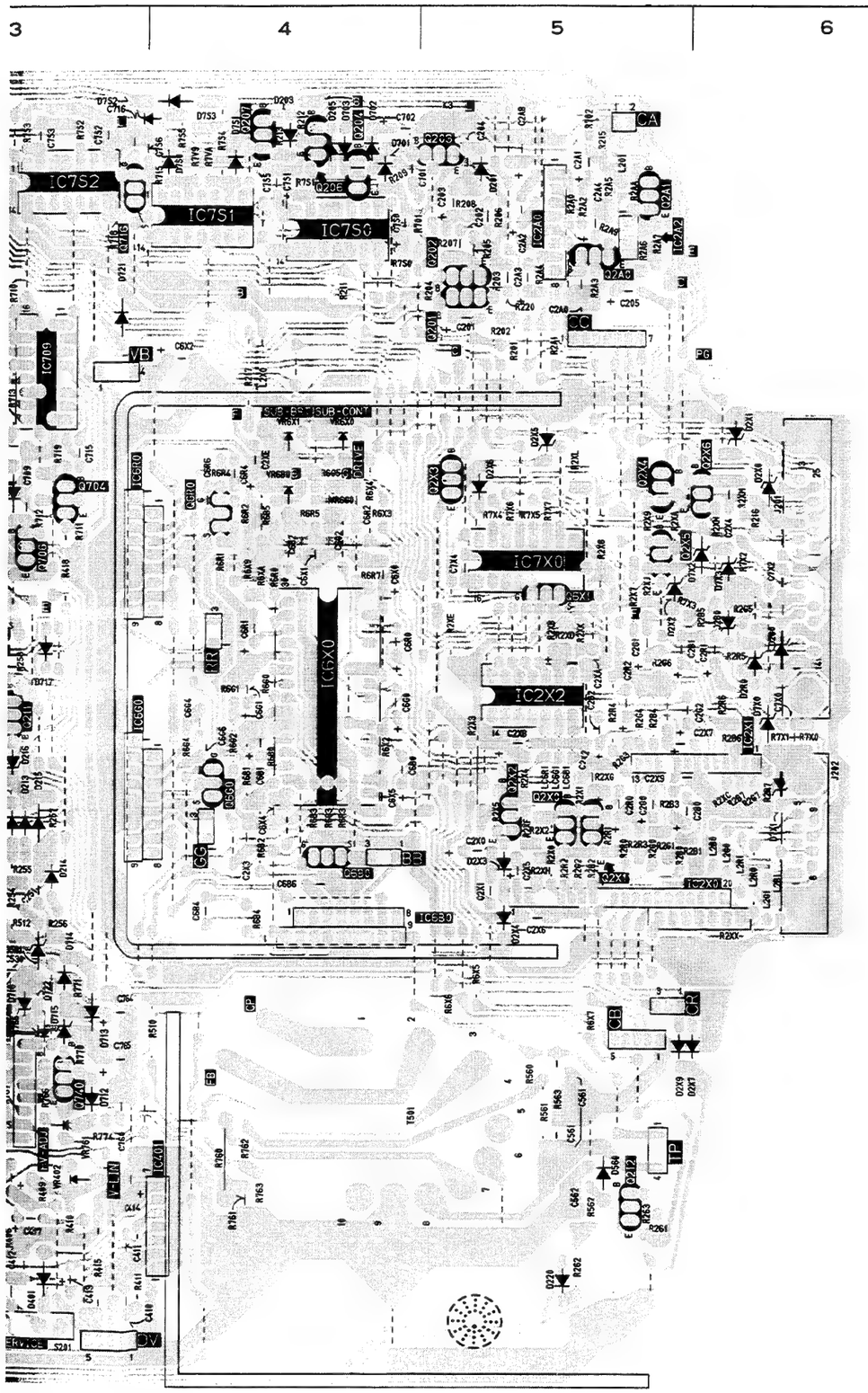
PCB-SW

SYMBOL NO.	ADDRESS
D290	A-4
D291	A-4
D293	A-3
D691	B-4
D692	B-4
D991	A-2
IC290	B-1
L290	A-1
Q290	A-4
Q291	A-4
Q292	A-1
Q293	A-1
Q294	A-2
VR290	B-2
VR292	A-1
VR293	A-1
VR294	A-1
VR691	B-4
VR692	B-3



PCB-MAIN

SYMBO NO.
D201
D202
D203
D204
D205
D210
D211
D212
D213
D214
D215
D216
D217
D220
D2B0
D2G0
D2R0
D2X0
D2X1
D2X2
D2X3
D2X4
D2X5
D2X6
D2X7
D2X9
D401
D501
D502
D503
D504
D560
D701
D702
D703
D710
D712
D713
D714
D715
D716
D717
D718
D719
D720
D721
D722
D7F1
D7F2
D7F3
D7M1
D7M2
D7M3
D7M4
D7M5
D7M6
D7M7
D7MA
D7MB
D7MC



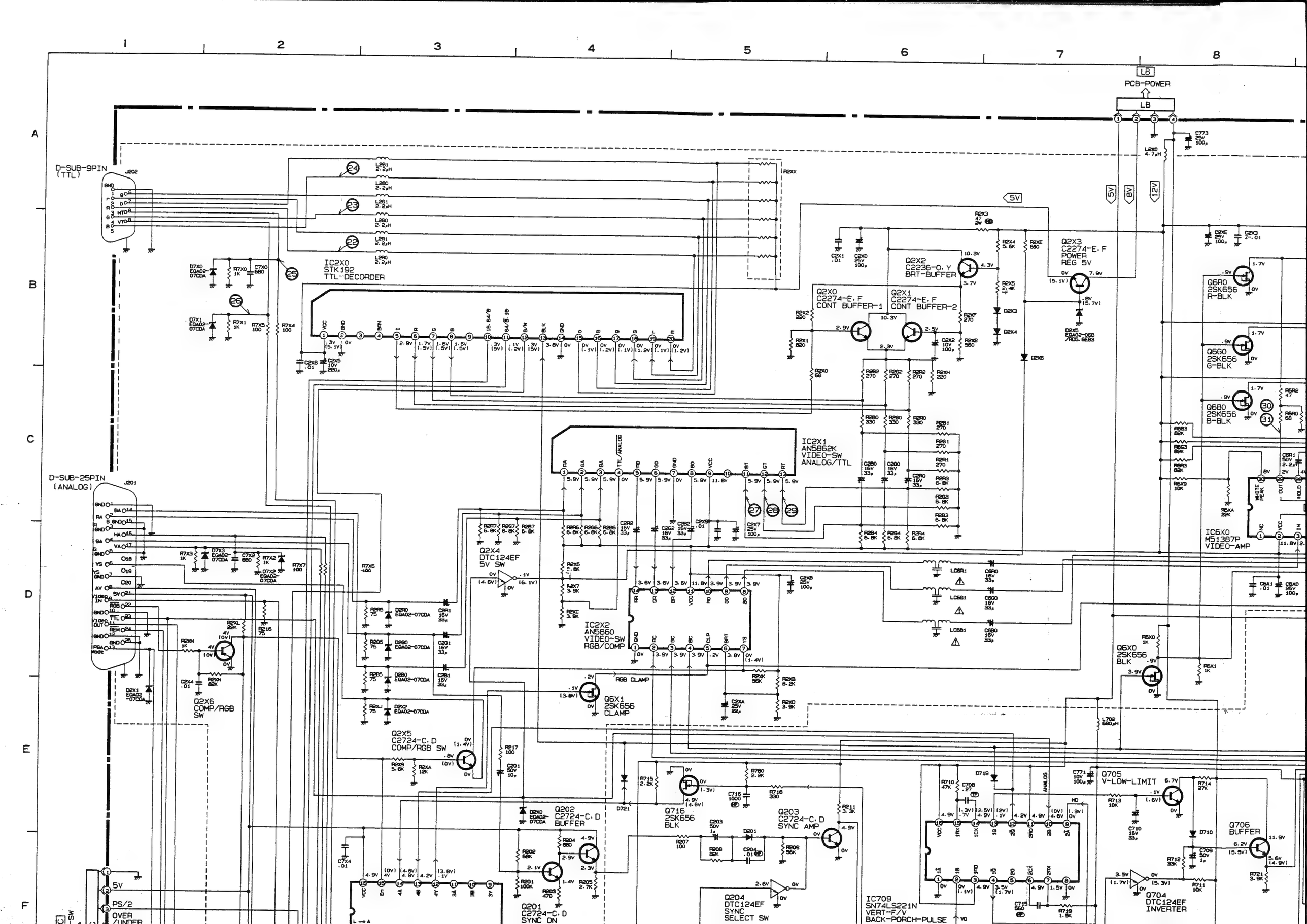
PCB-MAIN

SYMBOL NO.	ADDRESS
D201	A- 5
D202	C- 1
D203	A- 4
D204	A- 3
D205	A- 4
D210	C- 3
D211	C- 3
D212	C- 3
D213	C- 3
D214	C- 3
D215	C- 3
D216	C- 3
D217	C- 3
D220	E- 5
D2B0	C- 6
D2G0	C- 6
D2R0	C- 6
D2X0	B- 6
D2X1	B- 6
D2X2	C- 5
D2X3	D- 5
D2X4	D- 5
D2X5	B- 5
D2X6	B- 5
D2X7	D- 6
D2X9	D- 6
D401	E- 3
D501	D- 3
D502	D- 3
D503	D- 3
D504	D- 2
D560	E- 5
D701	A- 4
D702	A- 4
D703	A- 4
D710	B- 3
D712	D- 3
D713	D- 3
D714	D- 3
D715	D- 3
D716	D- 3
D717	C- 3
D718	E- 2
D719	B- 3
D720	D- 2
D721	A- 3
D722	D- 3
D7F1	D- 1
D7F2	E- 1
D7F3	E- 1
D7M1	C- 1
D7M2	C- 1
D7M3	C- 1
D7M4	C- 1
D7M5	B- 1
D7M6	A- 1
D7M7	A- 1
D7MA	B- 1
D7MB	B- 1
D7MC	B- 1

SYMBOL NO.	ADDRESS
D7MD	B- 1
D7S0	A- 4
D7S1	A- 4
D7S2	A- 3
D7S3	A- 4
D7V1	E- 1
D7V2	E- 1
D7X0	C- 6
D7X1	C- 6
D7X2	B- 6
D7X3	B- 6
DL201	A- 2
DL202	B- 2
DL631	A- 2
IC2A0	A- 5
IC2A1	A- 2
IC2A2	A- 5
IC2A3	A- 2
IC2X0	D- 6
IC2X1	C- 6
IC2X2	C- 5
IC401	E- 4
IC601	C- 2
IC6B0	D- 5
IC6G0	C- 4
IC6R0	B- 3
IC6X0	C- 4
IC701	A- 1
IC702	D- 2
IC703	D- 3
IC704	E- 2
IC705	E- 2
IC707	D- 3
IC709	B- 3
IC7F1	E- 1
IC7F2	D- 1
IC7F3	D- 1
IC7M1	C- 1
IC7M2	B- 1
IC7M5	B- 1
IC7S0	A- 4
IC7S1	A- 4
IC7S2	A- 3
IC7X0	B- 5
L201	A- 5
L2B0	C- 6
L2B1	D- 6
L2G0	C- 6
L2G1	D- 6
L2R0	D- 6
L2R1	C- 6
L2X0	B- 4
L501	C- 2
L601	B- 2
L631	C- 1
L632	B- 2
L633	B- 3

SYMBOL NO.	ADDRESS
L701	A- 1
L702	A- 3
LC6B1	C- 5
LC6G1	C- 5
LC6R1	C- 5
Q201	A- 5
Q202	A- 5
Q203	A- 5
Q204	A- 4
Q206	A- 4
Q207	A- 4
Q210	C- 3
Q211	C- 3
Q212	E- 5
Q214	A- 2
Q2A0	A- 5
Q2A1	A- 5
Q2M0	A- 3
Q2M1	A- 3
Q2M2	A- 3
Q2X0	C- 5
Q2X1	D- 5
Q2X2	C- 5
Q2X3	B- 5
Q2X4	B- 5
Q2X5	B- 6
Q2X6	B- 6
Q601	A- 2
Q602	B- 2
Q6B0	D- 4
Q6G0	C- 4
Q6R0	B- 4
Q6X0	C- 3
Q6X1	C- 5
Q701	A- 1
Q702	A- 1
Q704	B- 3
Q705	B- 3
Q706	B- 3
Q707	C- 3
Q711	E- 2
Q712	E- 3
Q713	E- 3
Q715	C- 3
Q716	A- 3
Q731	D- 2
Q740	D- 3
Q7M1	C- 1
Q7M5	A- 1
Q7M6	B- 1
Q7MA	B- 1
Q7MB	B- 1
Q7MC	B- 1
Q7MD	D- 1
Q7V1	E- 2
Q7V2	E- 2
TP31	C- 2

SYMBOL NO.	ADDRESS
TP32	C- 2
TP33	D- 1
TP34	D- 1
TP35	E- 2
TP36	E- 2
TP41	B- 2
TP42	B- 2
TP43	C- 2
TP44	B- 2
TP45	C- 3
TP46	C- 3
TP8A	D- 2
TP8B	D- 1
TP8C	E- 1
TP8D	E- 1
VR201	B- 3
VR202	B- 3
VR401	D- 3
VR402	E- 3
VR501	D- 2
VR601	B- 2
VR631	B- 3
VR6B0	B- 4
VR6G0	B- 4
VR6X0	B- 4
VR6X1	B- 4
VR701	D- 3
VR702	E- 2
VR703	D- 2
VR761	E- 3
VR771	D- 3
VR7F1	E- 1
VR7F2	E- 1
VR7F3	D- 1
VR7F4	C- 2
VR7F5	E- 1
X601	B- 2


D-SUB-9PIN (TTL)
J202
IC2X0 STK192 TTL-DECORDER
D-SUB-25PIN (ANALOG)
J201
IC2X1 AN5862K VIDEO-SW ANALOG/TTL
IC2X2 AN5860 VIDEO-SW RGB/COMP
Q2X0 C2274-E, F CONT BUFFER-1
Q2X1 C2274-E, F CONT BUFFER-2
Q2X2 C2236-O, Y BRT-BUFFER
Q2X3 C2274-E, F POWER REG 5V
Q2X4 DTC124EF 5V SW
Q2X5 C2724-C, D COMP/RGB SW
Q2X6 COMP/RGB SW
Q6X0 2SK656 BLK
Q6X1 2SK656 CLAMP
Q6R0 2SK656 R-BLK
Q6G0 2SK656 G-BLK
Q6B0 2SK656 B-BLK
Q201 C2724-C, D SYNC ON
Q202 C2724-C, D BUFFER
Q203 C2724-C, D SYNC AMP
Q204 DTC124EF SYNC SELECT SW
Q705 V-LOW-LIMIT
Q706 BUFFER
Q704 DTC124EF INVERTER
Q716 2SK656 BLK
IC709 SN74LS221N VERT-F/V BACK-PORCH-PULSE
IC6X0 M51387P VIDEO-AMP
PCB-POWER
LB
5V
8V
12V
RGB CLAMP

6 7 8 9 10 11 12 13

LB PCB-POWER

VB PCB-POWER

⚠ PCB-MAIN

⚠ PCB-CRT

5V 8V 12V 100V

IC6R0 STK181B VIDEO-OUT R

IC6G0 STK181B VIDEO-OUT G

IC6B0 STK181B VIDEO-OUT B

IC6X0 M51387P VIDEO-AMP

R-CUT-OFF G-CUT-OFF B-CUT-OFF

PCB-SW (CONTROL) CB

PCB-POWER B2

DRIVE SUB-BRT SUB-CONT

SERVICE-SW S201

Q2X2 C2236-O, Y BAT-BUFFER

Q2X1 C2274-E, F CONT BUFFER-2

Q2X3 C2274-E, F POWER REG 5V

Q6R0 2SK656 R-BLK

Q6G0 2SK656 G-BLK

Q6B0 2SK656 B-BLK

Q6X0 2SK656 BLK

Q715 2SK656 CLAMP

Q705 V-LOW-LIMIT

Q706 BUFFER

Q704 DTC124EF INVERTER

Q707 DTC124EF RGB/COMP-SW

IC709 SN74LS221N VERT-F/V BACK-PORCH-PULSE

IC705 SN74LS123N MUTE-PULSE

IC702 SN74LS123N HOR-PULSE

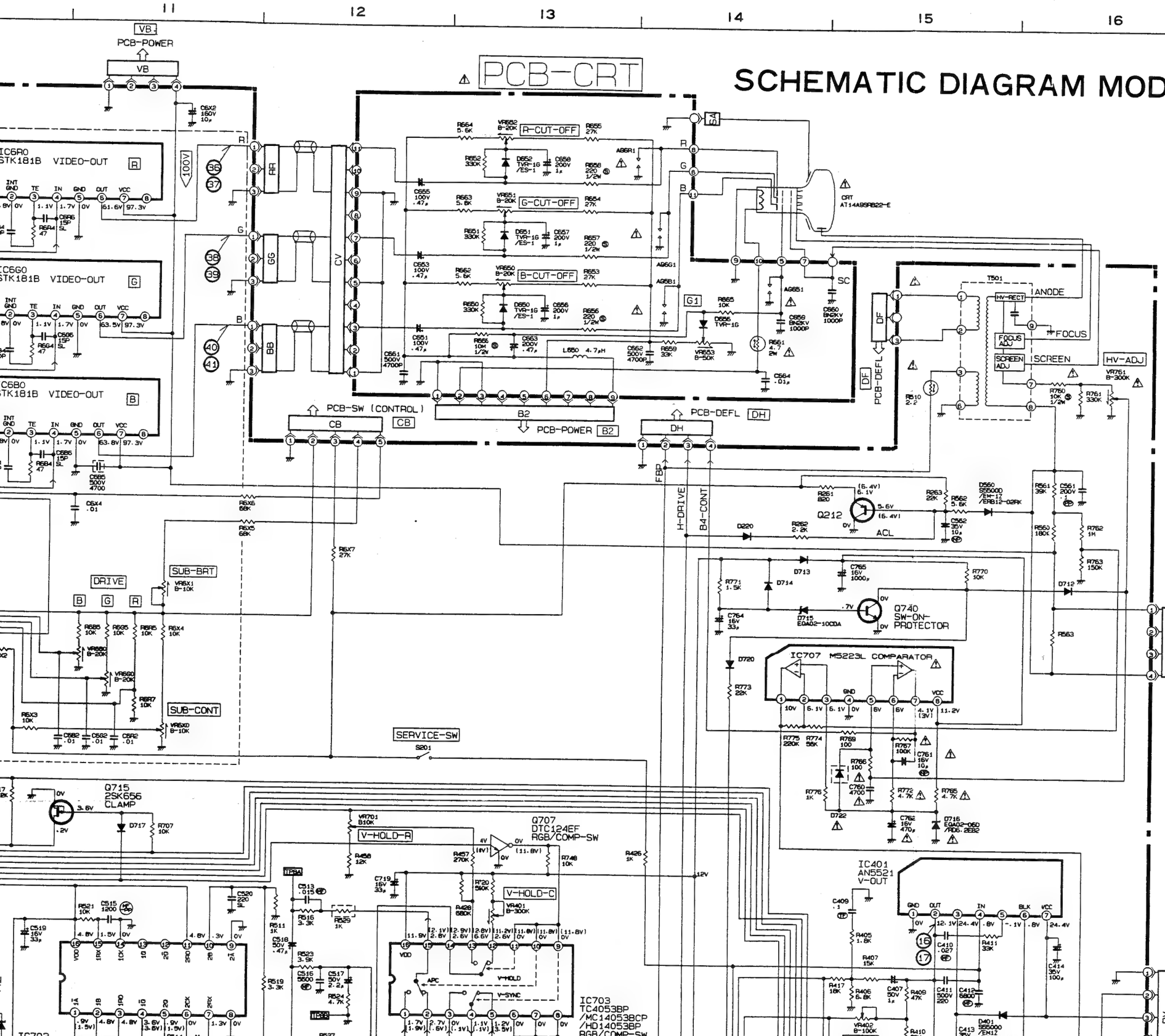
IC703 TC4053BP /MC14053BCP /HD14053BP RGB/COMP-SW

V-HOLD-R V-HOLD-C

APC V-HOLD V-SYNC

H-DRIVE

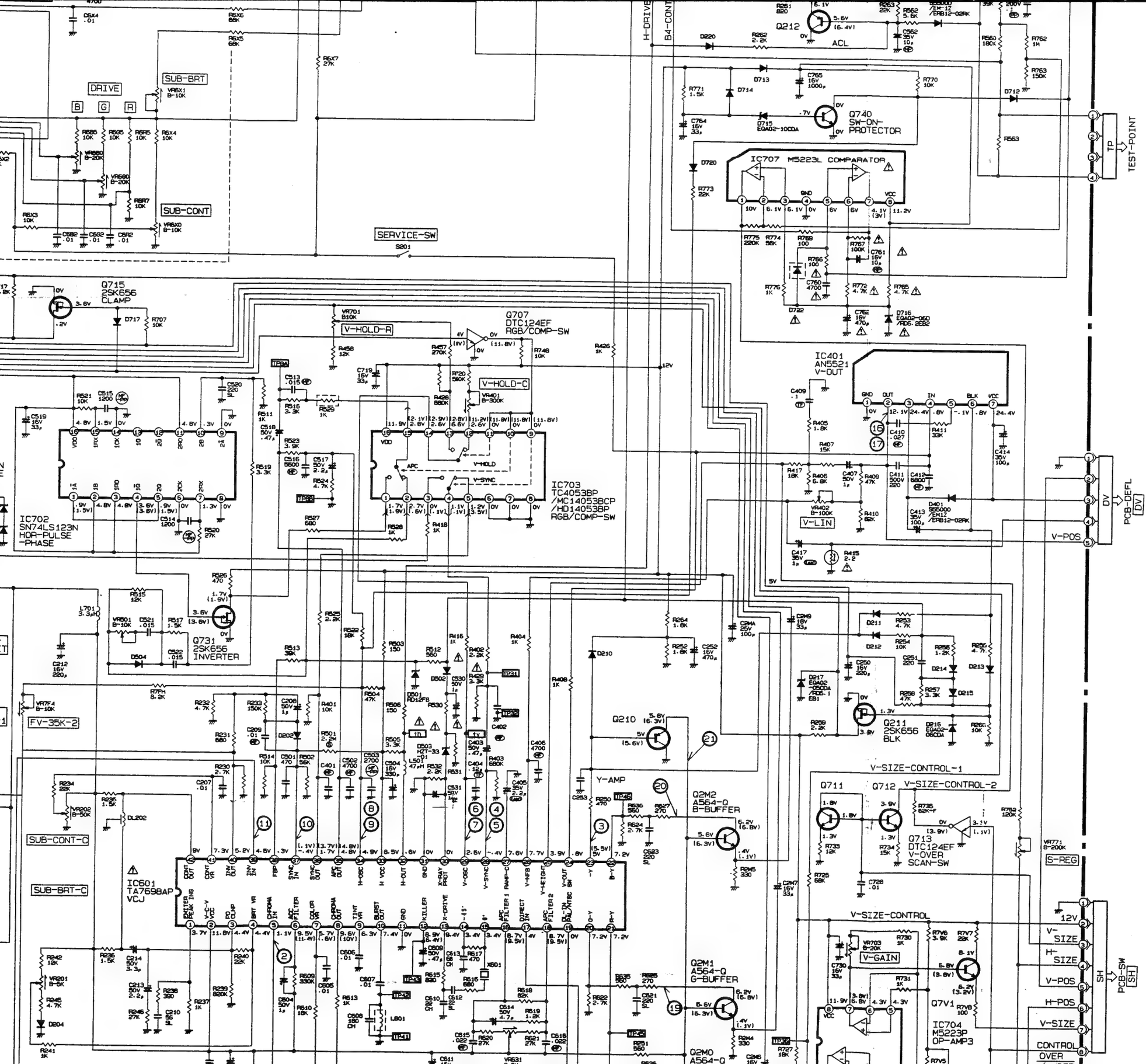
SCHEMATIC DIAGRAM MODEL : EUM-1491A



NOTE 1:

1. The unit of resistance "ohm" no symbol.
   Accordingly, K = 1000 ohms
   M = 1000K ohms.
2. The wattage of resistor, if not specifically designated, is less than 1/4 watt.
3. Resistors, if not specifically designated, are carbon resistors.
4. The marks of resistors are as follows:
   - (CE) : Cemented resistor
   - (MB) : Metal oxide film resistor (type B)
   - (MPC) : Metal plate cement resistor.
   - (S) : Fixed composition resistor
   - (W) : Wire wound resistor
   - (M) : Metal film resistor
5. The tolerance of resistor value is:
   Not specified =±5%, K = ±10% M = ±20%
6. The unit of capacitance, if not specifically designated, is:
   a) μF, for numbers less than 1
   b) PF, for numbers more than 1
7. Capacitors, if not specifically designated are Ceramic capacitors except electrolytic capacitors.
8. The marks of capacitors are as follows:
   - (ALM) : Aluminus electrolytic capacitor
   - (MF) : Polyester capacitor
   - (PP) : Polypropylene film capacitor
   - (TANT) : Tantalum capacitor
   - (TF) : Twin film capacitor.
   - (MF.PP) : Polyester polypropylene film capacitor.
   - (MPP) : Metallize plastic film capacitor.
   - (NP) : Non polarized electrolytic capacitor.
   - ⏚ : Electrolytic capacitor
9. The DC working voltage of capacitor, if not specifically designated is: 50V
10. The tolerance of capacitor value, if not specifically designated is: ±10% for polyester capacitor
    ±5% for ceramic capacitor
    and J =±5% K =±10% M =±20% P = +100% −0%
    C =±0.25PF D = ±0.5PF F =±1PF Z = +80% −20% N = ±30%

SPECIFIC SYMBOL	
Zener Diode	Varistor
Crystal unit	Thermistor



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MPC	:	Metal plate cement resistor.
S	:	Fixed composition resistor
W	:	Wire wound resistor
M	:	Metal film resistor

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TF	:	Twin film capacitor.
MF.PP	:	Polyester polypropylene film capacitor.
MPP	:	Metallize plastic film capacitor.
NP	:	Non polarized electrolytic capacitor.
⏚	:	Electrolytic capacitor

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    ±5% for ceramic capacitor
    and J =±5% K =±10% M =±20% P = +100% / −0%
    C =±0.25PF D = ±0.5PF F =±1PF Z = +80% / −20% N = ±30%

SPECIFIC SYMBOL

	Zener Diode		Varistor
	Varicap		Crystal unit
	Posistor		Air Gap
	Thermistor		Part (resistor) attached on the copper-foil side of PCB
	Fusible Resistor		Ceramic filter

NOTE 2:

1. DC voltages were measured from points indicated to the circuit ground with a high — Z voltmeter.
2. Waveforms were taken with offset rainbow color bar signal.
3. This is a basic schematic diagram. Some sets may be subject to modification according to engineering improvement.
4. VOLTAGE ( ) = TTL SIGNAL

⚠

SERVICING PRECAUTION

SYMBOLS INDICATE COMPONENTS HAVING SPECIAL CHARACTERISTICS IMPORTANT TO SAFETY AND PERFORMANCE. THEREFOR REPLACEMENT OF ANY SAFETY PARTS SHOULD BE IDENTICAL IN VALUE AND CHARACTERISTICS.

DON'T DEGRADE THE SAFETY OF THE RECEIVERS THROUGH IMPROPER SERVICING.

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SUB-CONT

SERVICE-SW
S201

Q6X0
2SK656
BLK

Q715
2SK656
CLAMP

V-HOLD-R

Q707
DTC124EF
RGB/COMP-SW

V-HOLD-C

Q203
C2724-C,D
SYNC AMP

Q705
V-LOW-LIMIT

Q706
BUFFER

Q704
DTC124EF
INVERTER

IC709
SN74LS221N
VERT-F/V
BACK-PORCH-PULSE

IC705
SN74LS123N
MUTE-PULSE

IC702
SN74LS123N
HOR-PULSE
-PHASE

IC701
SN74LS221N
HOR-SYNC-PHASE

IC7F3
M5223P
OP-AMP2

IC7F2
M5223P
OP-AMP1

IC7F1
IR9331
H F/V CONVERTER

LOW-LIMIT

FV-35K-1

FV-35K-2

FV-15K

FV-ADJ

Q731
2SK656
INVERTER

SUB-CONT-C

SUB-BRT-C

IC601
TA7698AP
VCJ

Q701
H-PHASE
CONTROL-1

Q702
H-PHASE
CONTROL-2

Q7M1
DTC124EF
MUTE

IC7M2
SN74LS42N
H-MODE
DECORDER

IC7M1
UPC339C
/MC3302P
H-MODE-
COMP
ARATOR

IC7M5
SN74LS08N
/HD74LS08P
H-OVER SCAN
MONOCHROME
DECORDER

Q7M5
DTC124EF
ANALOG/TTL SW

Q7M6
DTC124EF
MONO SW

Q7MA
DTC124EF
H-OVER
SCAN
SW-1

Q7MB
DTC124EF
H-OVER
SCAN
SW-2

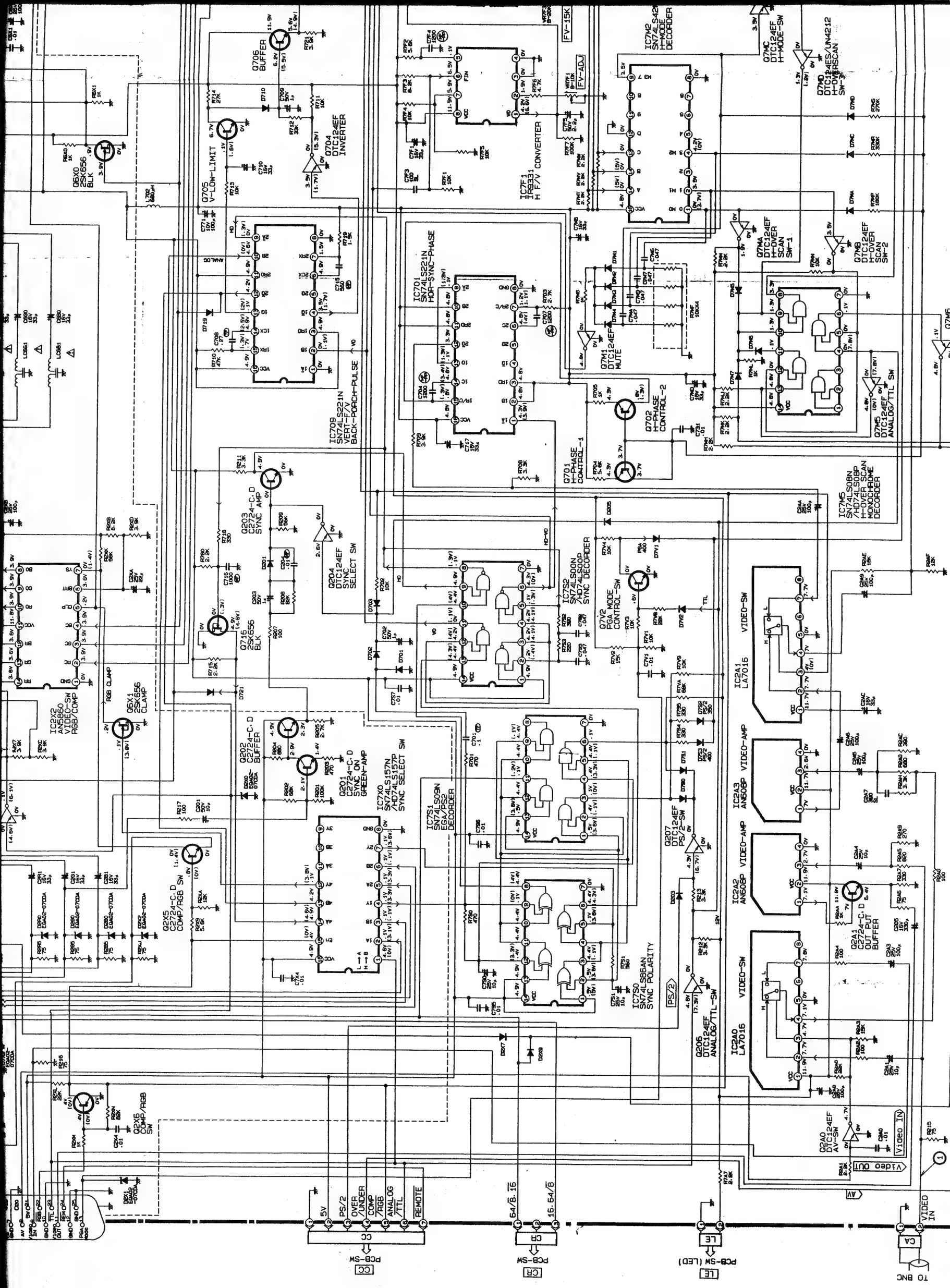
Q7MC
DTC124EF
H-MODE-SW

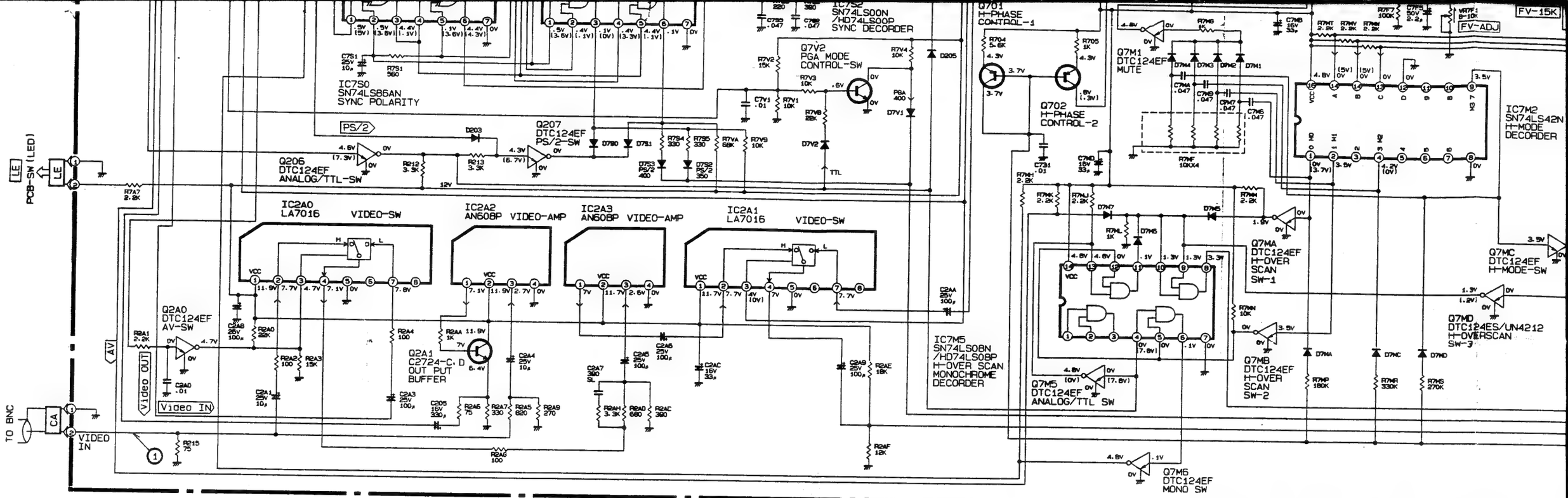
Q7MD
DTC124ES/UN4212
H-OVERSCAN
SW-3

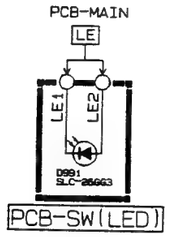
SUB-COLOR

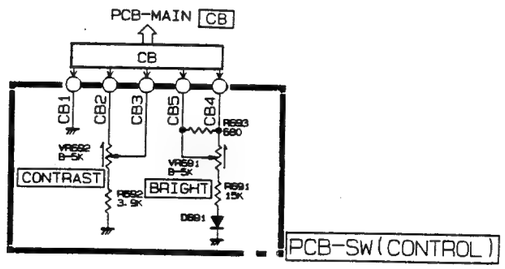
OSC

COLOR


IC709 SN74LS221N VERT-F/V BACK-PORCH-PULSE
IC701 SN74LS221N HOR-SYNC-PHASE
IC7F1 IR9331 H F/V CONVERTER
IC7M2 SN74LS42N H-MODE DECORDER
IC7M5 SN74LS08N /HD74LS08P H-OVER SCAN MONOCHROME DECORDER
IC7S2 SN74LS00N /HD74LS00P SYNC DECORDER
IC7S1 SN74LS09N EGA/PS2 DECORDER
IC7X0 SN74LS157N /HD74LS157P SYNC SELECT SW
IC7S0 SN74LS86AN SYNC POLARITY
IC2A1 LA7016 VIDEO-SW
IC2A0 LA7016 VIDEO-SW
IC2A2 AN608P VIDEO-AMP
IC2A3 AN608P VIDEO-AMP
IC2X2 AN5860 VIDEO-SW RGB/COMP
Q706 BUFFER
Q705 V-LOW-LIMIT
Q704 DTC124EF INVERTER
Q06X0 2SK656 BLK
Q06X1 2SK656 CLAMP
Q716 2SK656 BLK
Q203 C2724-C.D SYNC AMP
Q204 DTC124EF SYNC SELECT SW
Q202 C2724-C.D BUFFER
Q201 C2724-C.D SYNC ON GREEN-AMP
Q2X5 C2724-C.D COMP/RGB SW
Q2X6 COMP/RGB SW
Q701 H-PHASE CONTROL-1
Q702 H-PHASE CONTROL-2
Q7M1 DTC124EF MUTE
Q7MA DTC124EF H-OVER SCAN SW-1
Q7MB DTC124EF H-OVER SCAN SW-2
Q7MC DTC124EF H-MODE-SW
Q7MD DTC124ES/UN4212 H-OVERSCAN SW-3
Q7M5 DTC124EF ANALOG/TTL SW
Q7V2 PGA MODE CONTROL-SW
Q207 DTC124EF PS/2-SW
Q206 DTC124EF ANALOG/TTL-SW
Q2A1 C2724-C.D OUTPUT BUFFER
Q2A0 DTC124EF AV-SW
FV-15K
FV-ADJ
PS/2
5V
PS/2
OVER /UNDER
COMP /RGB
ANALOG /TTL
REMOTE
64/8.16
16.64/8
PCB-SW
CC
CR
LE
PCB-SW (LED)
TO BNC
VIDEO IN
Video IN
Video OUT
CA
AV

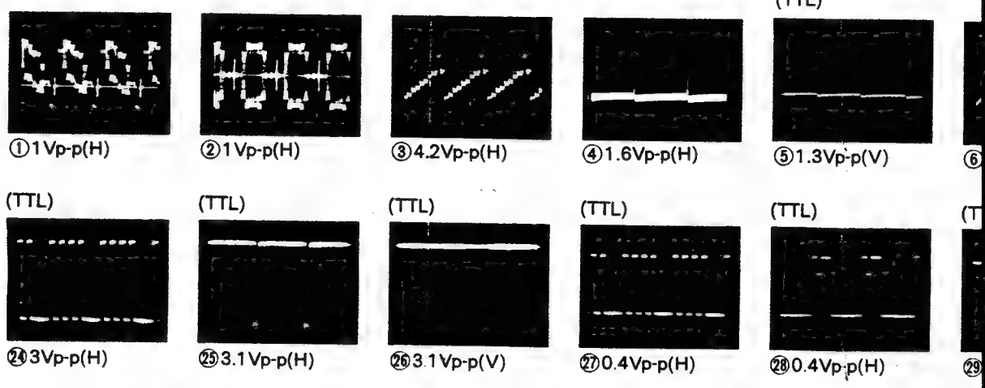






NPN IS 2SC2603-E,F/2SC2785-H,F,E OTHER WISE SPECIFIED
PNP IS 2SA1115-E,F/2SA1175-H,F,E OTHER WISE SPECIFIED
DIODE IS 1S2076A/1S2471 OTHER WISE SPECIFIED

CHASSIS WAVEFORMS



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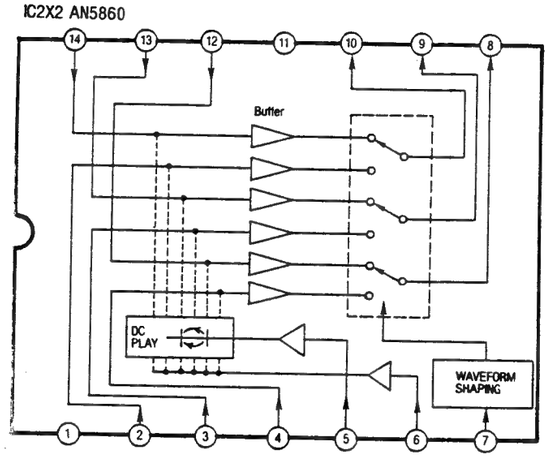

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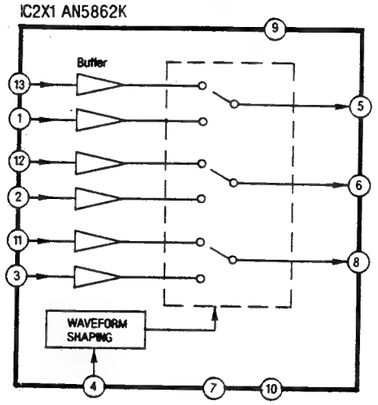

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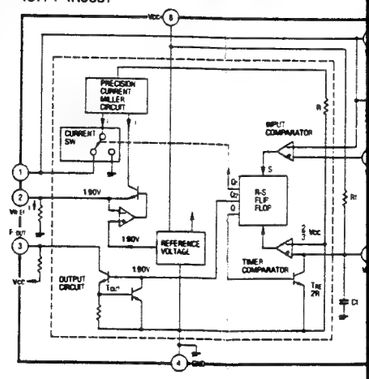
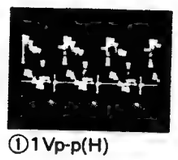
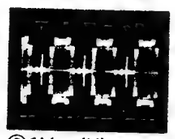


C2785-H.F.E OTHER WISE SPECIFIED
175-H.F.E OTHER WISE SPECIFIED
1 OTHER WISE SPECIFIED

CHASSIS WAVEFORMS


①1Vp-p(H)


②1Vp-p(H)


③4.2Vp-p(H)


④1.6Vp-p(H)

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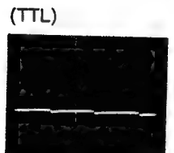
⑤1.3Vp-p(V)

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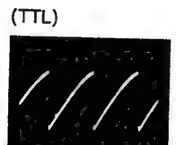
⑥2.2Vp-p(V)

(TTL)

⑦2.3Vp-p(V)


⑧2.5Vp-p(H)

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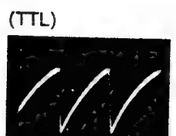
⑨2.5Vp-p(V)


⑩2.5Vp-p(H)


⑪3.4Vp-p(H)


⑯50Vp-p

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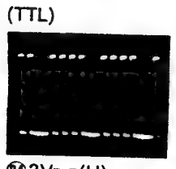
㉔3Vp-p(H)

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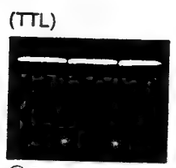
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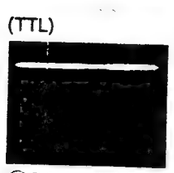
㉖3.1Vp-p(V)

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㉗0.4Vp-p(H)

(TTL)

㉘0.4Vp-p(H)

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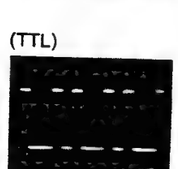
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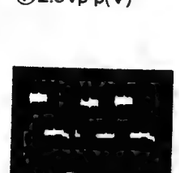
㉚3.0Vp-p(H)

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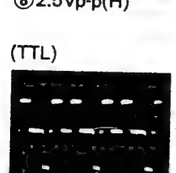
㉛2.6Vp-p(H)

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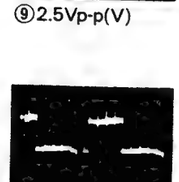
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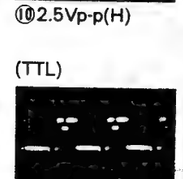
㉝2.5Vp-p(H)

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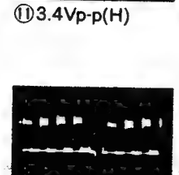
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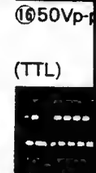
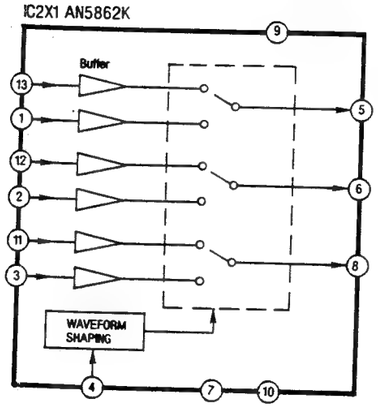
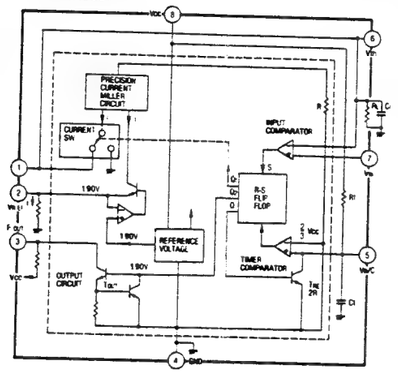

㉟2.5Vp-p

IC2X1 AN5862K



IC7F1 IR9331



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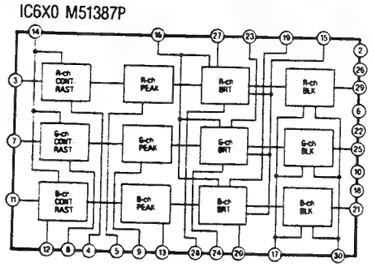
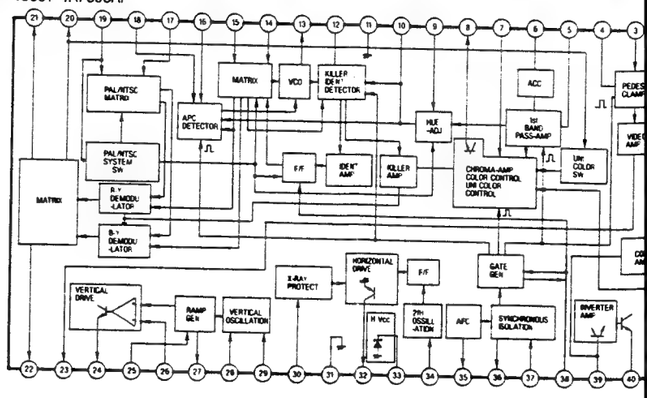


IC601 TA7698AP



SERVICING PRECAUTION

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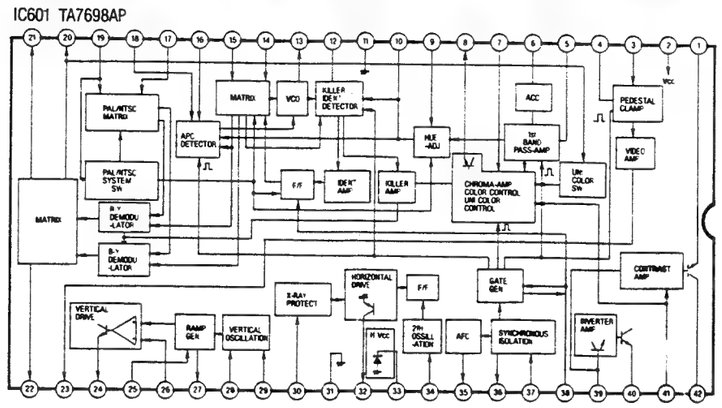
Printed in Japan

(TTL) ⑨2.5Vp-p(V) ⑩2.5Vp-p(H) ⑪3.4Vp-p(H) ⑯50Vp-p(V) (TTL) ⑰46Vp-p(V) ⑱1.9Vp-p(H) ⑲1.9Vp-p(H) ⑳1.9Vp-p(H) ㉑2.7Vp-p(H) (TTL) ㉒3Vp-p(H) (TTL) ㉓3Vp-p(H)

(TTL) ㉜3.0Vp-p(H) (TTL) ㉝2.5Vp-p(H) ㉞2.8Vp-p(H) (TTL) ㉟2.5Vp-p(H) ㊱50Vp-p(H) (TTL) ㊲48Vp-p(H) ㊳50Vp-p(H) (TTL) ㊴45Vp-p(H) ㊵50Vp-p(H) (TTL) ㊶45Vp-p(H)

IC601 TA7698AP



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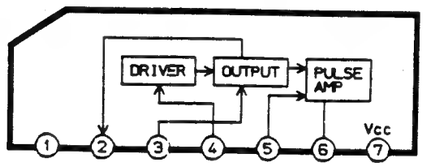
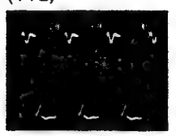


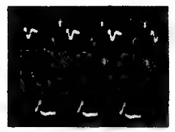
CHASSIS WAVEFORMS

⑫0.6Vp-p(H)

(TTL)



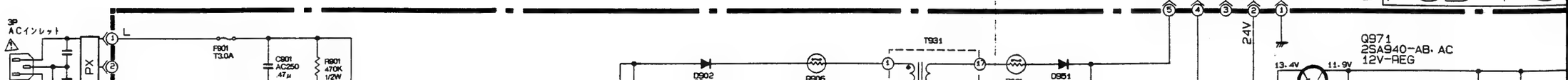
⑬0.6Vp-p(H)



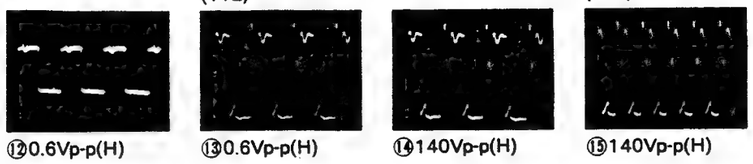
⑭140Vp-p(H)

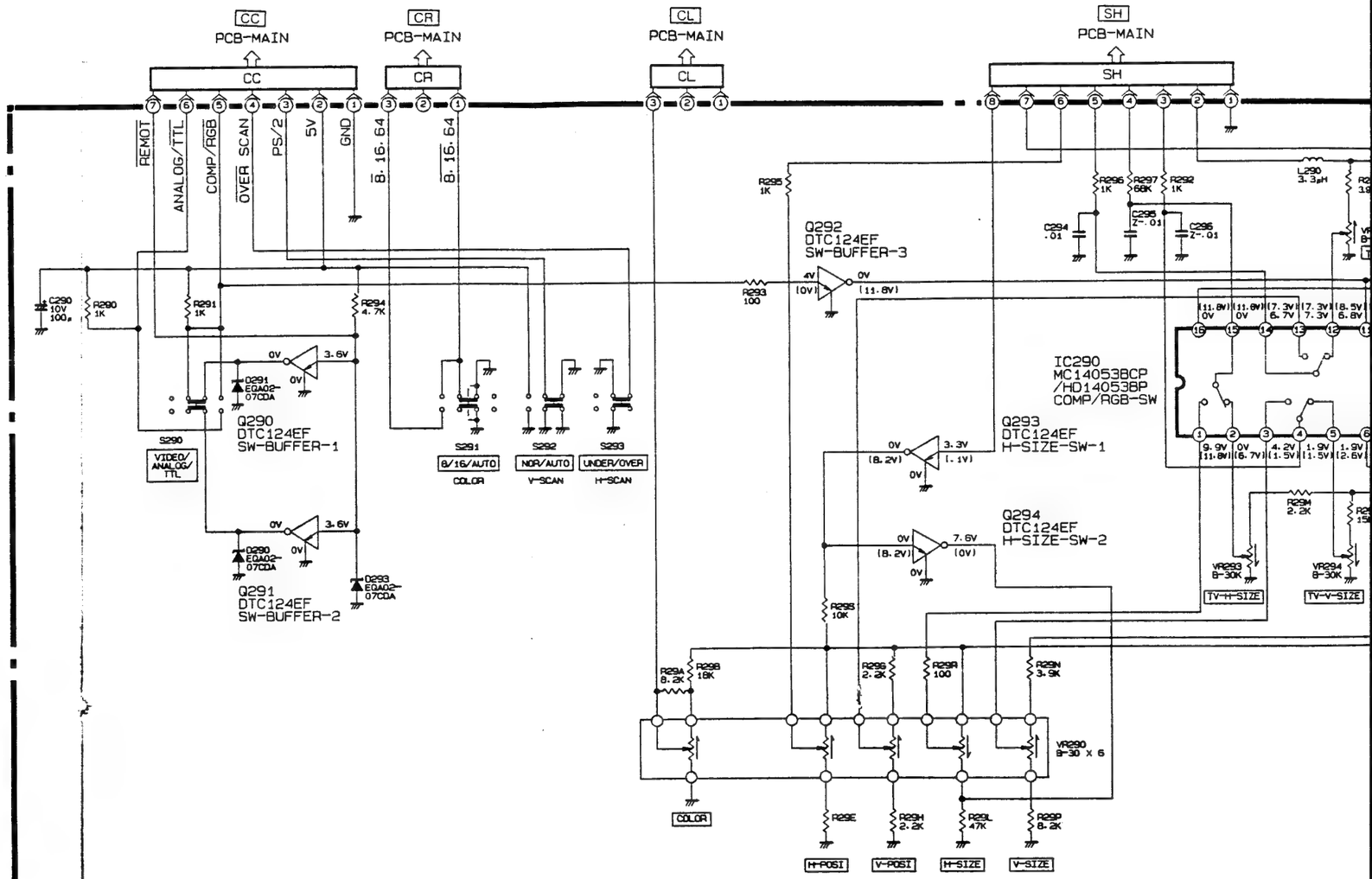
(TTL)

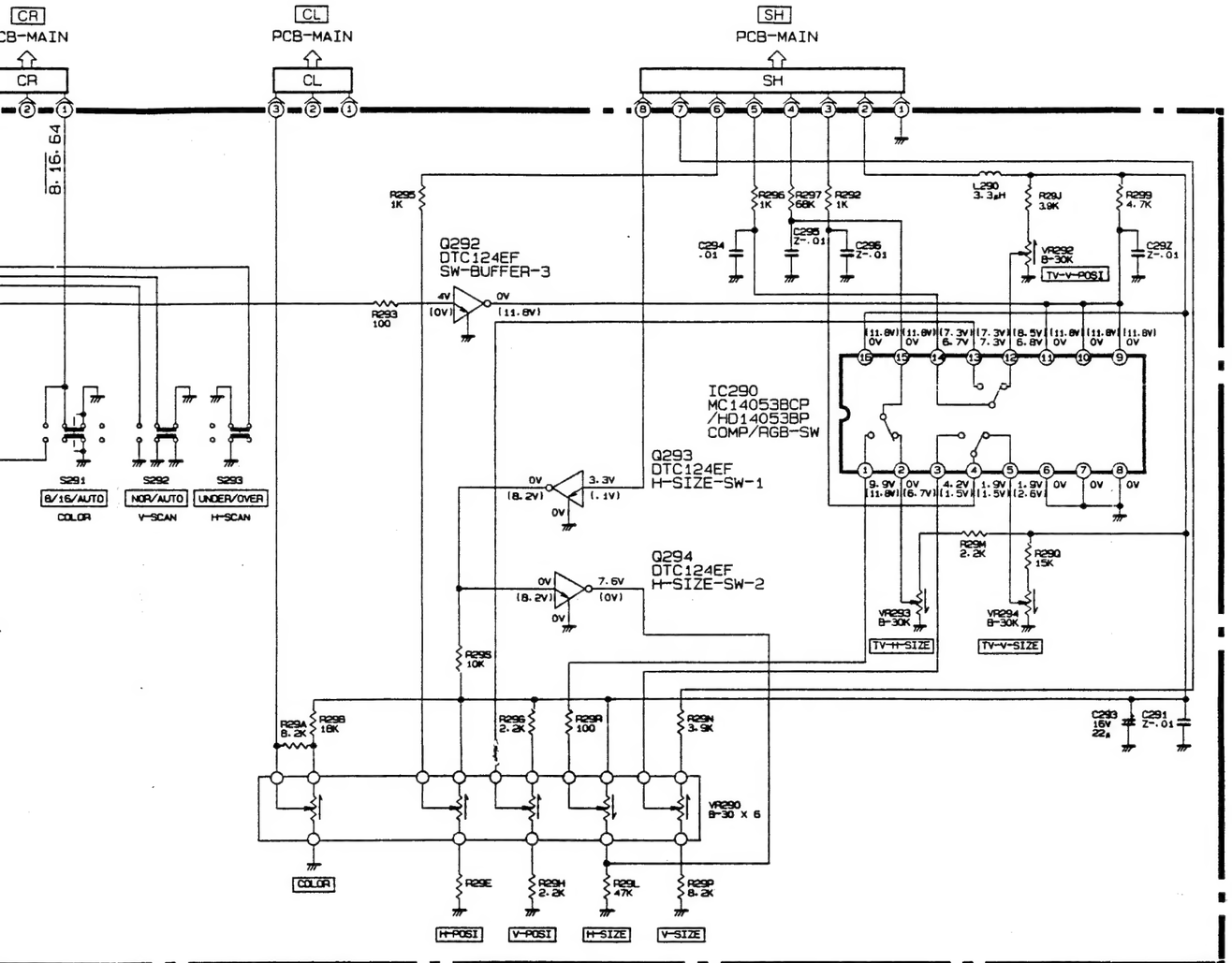
⑮140Vp-p(H)



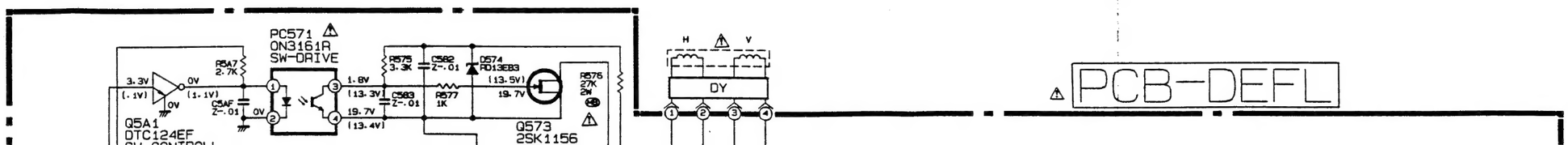
CHASSIS WAVEFORMS



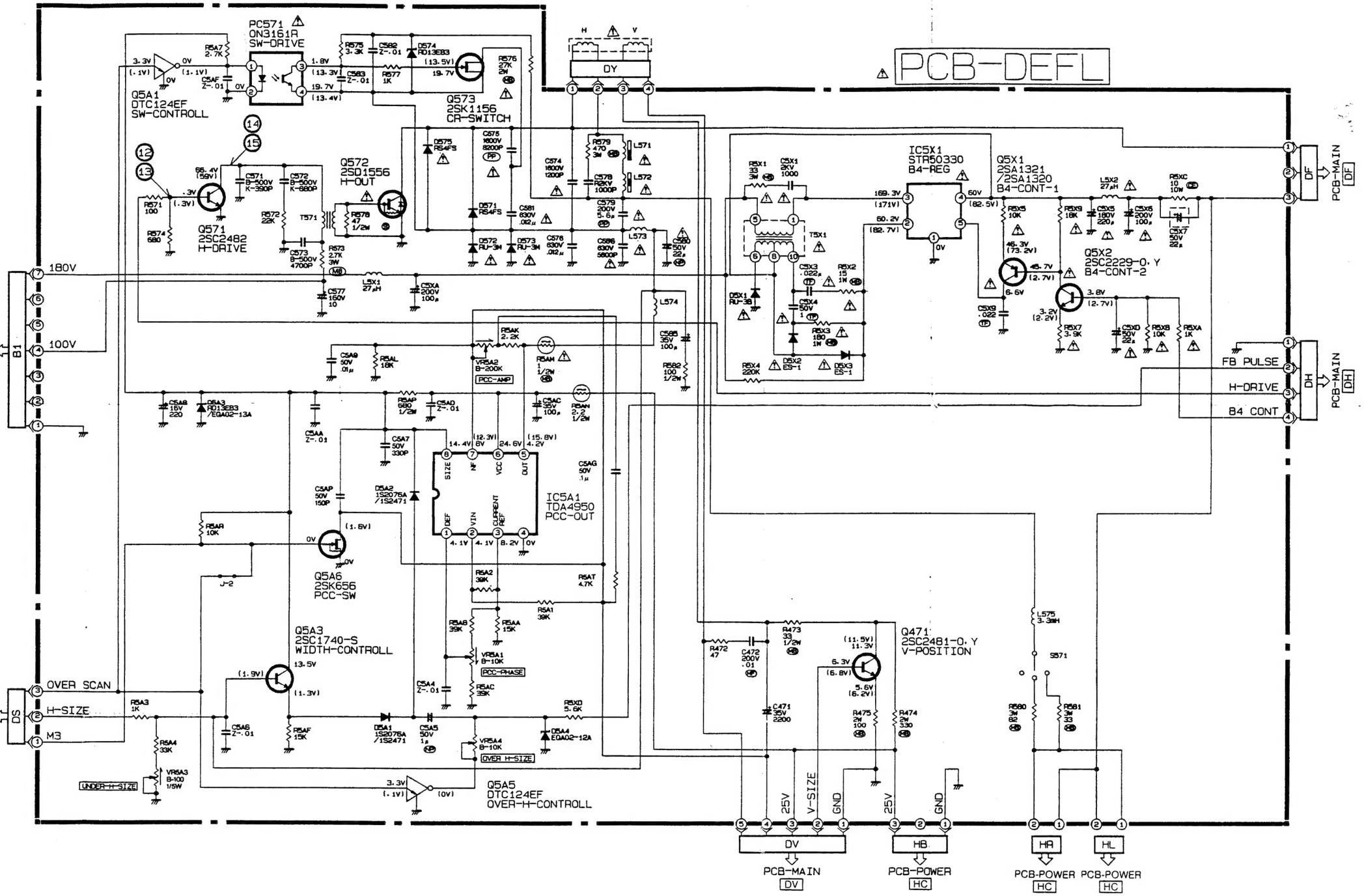


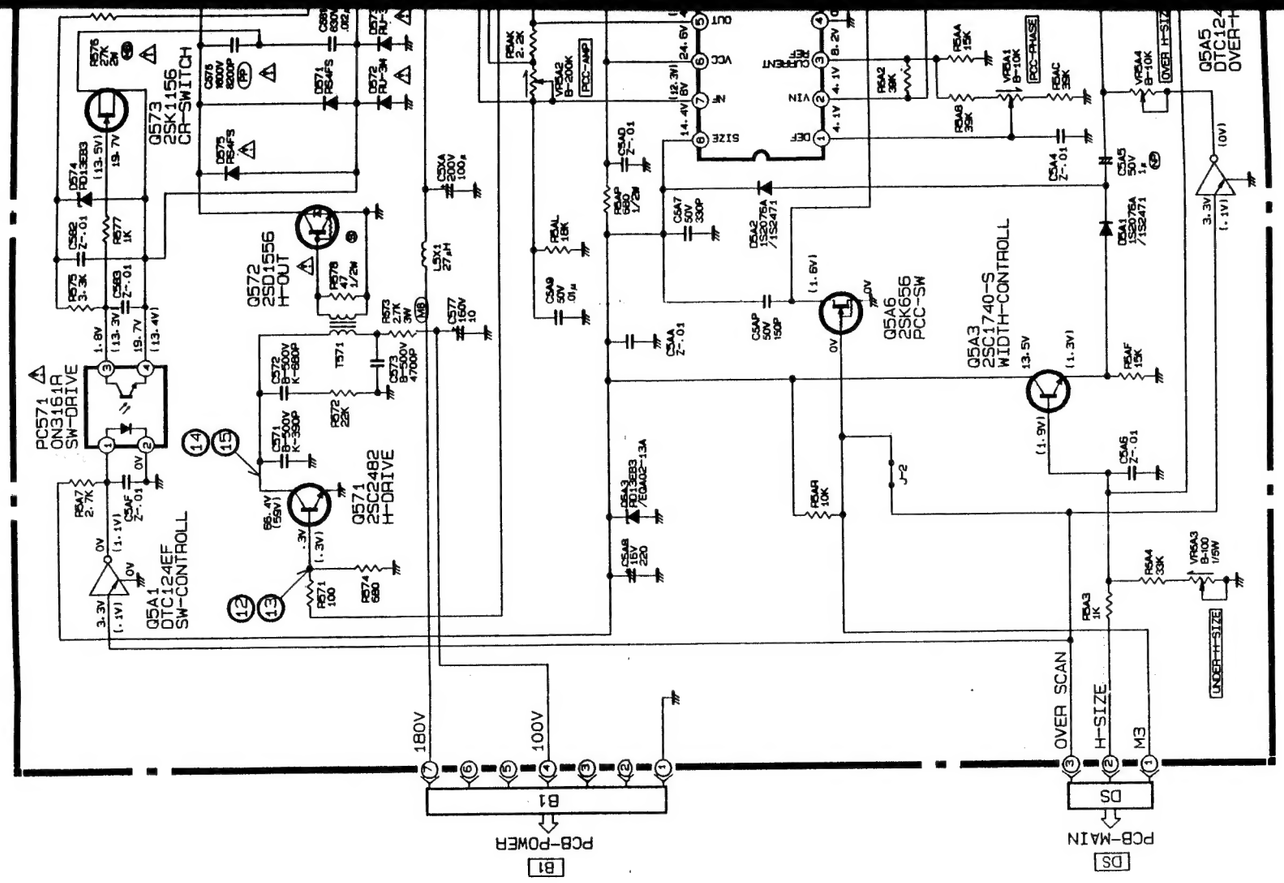


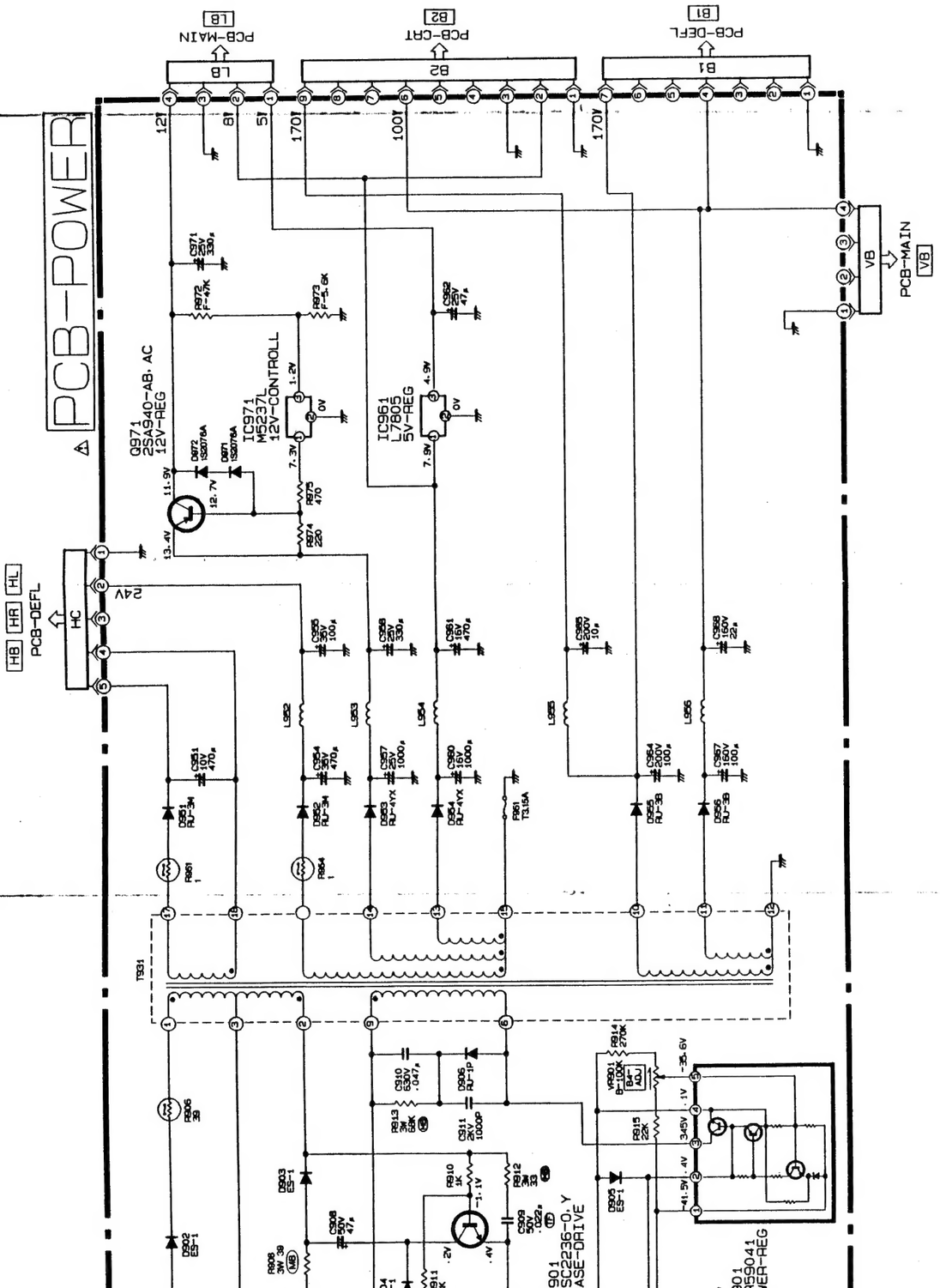
PCB-SW

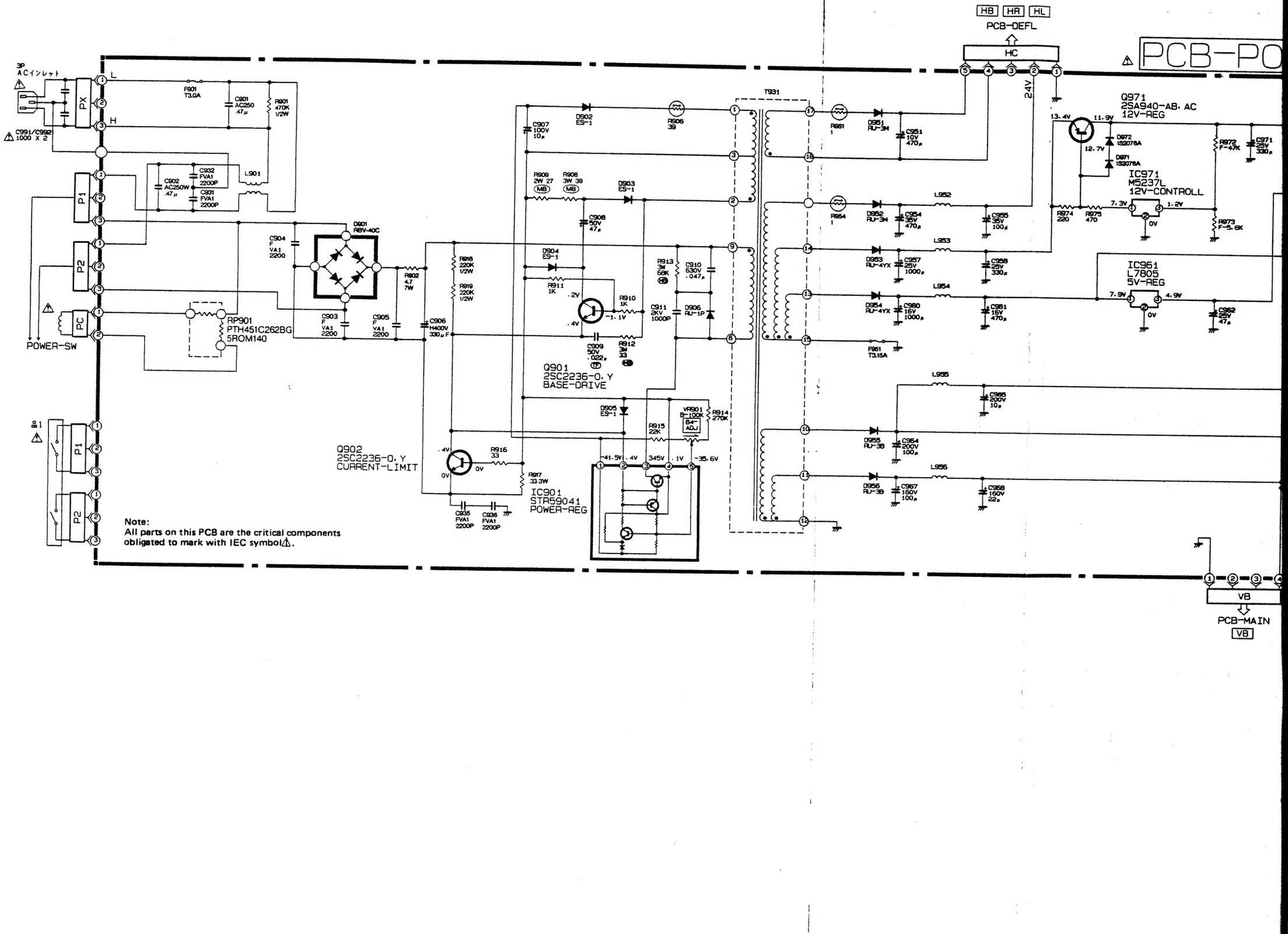


⚠ PCB-DEFL


PCB-DEFL
PC571
ON3161R
SW-DRIVE
Q5A1
DTC124EF
SW-CONTROLL
Q573
2SK1156
CR-SWITCH
Q572
2SD1556
H-OUT
Q571
2SC2482
H-DRIVE
DY
IC5X1
STR50330
B4-REG
Q5X1
2SA1321
/2SA1320
B4-CONT-1
Q5X2
2SC2229-O, Y
B4-CONT-2
T5X1
180V
100V
B1
FB PULSE
H-DRIVE
B4 CONT
DF
DH
PCB-MAIN
IC5A1
TDA4950
PCC-OUT
Q5A6
2SK656
PCC-SW
Q5A3
2SC1740-S
WIDTH-CONTROLL
Q5A5
DTC124EF
OVER-H-CONTROLL
Q471
2SC2481-O, Y
V-POSITION
OVER SCAN
H-SIZE
M3
DS
UNDER-H-SIZE
OVER H-SIZE
PCC-PHASE
PCC-AMP
V-SIZE
25V
GND
DV
HB
HA
HL
PCB-POWER
HC


Q573
2SK1456
CR-SWITCH
Q572
2SD1556
H-OUT
PC571
ON3161R
SW-DRIVE
Q571
2SC2482
H-DRIVE
Q5A1
DTC124EF
SW-CONTROLL
Q5A6
2SK656
PCC-SW
Q5A3
2SC1740-S
WIDTH-CONTROLL
Q5A5
DTC124
OVER H-SIZE
180V
100V
B1
PCB-POWER
OVER SCAN
H-SIZE
M3
DS
PCB-MAIN


PCB-POWER
PCB-MAIN
PCB-CRT
PCB-DEFL
PCB-DEFL
HB HR HL
24V
Q971
2SA940-AB, AC
12V-REG
IC971
M5237L
12V-CONTROLL
IC961
L7805
5V-REG
Q901
2SC2236-O, Y
BASE-DRIVE
Q902
2SA940-AB, AC
POWER-REG
T931
PCB-MAIN


PCB-DEFL
HB HR HL
HC
PCB-PO
24V
3P
ACインレット
L
H
PX
P1
P2
PC
POWER-SW
F901
T3.0A
C901
AC250
.47μ
R901
470K
1/2W
C991/C992
1000 X 2
C902
AC250W
.47μ
C932
FVA1
2200P
C931
FVA1
2200P
L901
D901
RBV-40C
C904
FVA1
2200
C903
FVA1
2200
C905
FVA1
2200
R902
4.7
7W
C906
400V
330μF
R918
220K
1/2W
R919
220K
1/2W
RP901
PTH451C262BG
5ROM140
T931
D902
ES-1
R906
39
C907
100V
10μ
R909
2W 27
MB
R908
3W 39
MB
D903
ES-1
C908
50V
47μ
D904
ES-1
R911
1K
.2V
.4V
R910
1K
-1.1V
R913
3W
68K
HB
C910
630V
.047μ
C911
2KV
1000P
D906
RU-1P
C909
50V
.022μ
TF
R912
3W
33
HB
Q901
2SC2236-O.Y
BASE-DRIVE
D905
ES-1
VR901
B-100K
B4-
ADJ
R914
270K
R915
22K
Q902
2SC2236-O.Y
CURRENT-LIMIT
.4V
0V
R916
33
R917
.33W
C935
FVA1
2200P
C936
FVA1
2200P
IC901
STR59041
POWER-REG
-41.5V
.4V
345V
.1V
-35.6V
D951
RU-3M
C951
10V
470μ
R951
1
R952
1
D952
RU-3M
C954
35V
470μ
C955
35V
100μ
L952
D953
RU-4YX
C957
25V
1000μ
C958
25V
330μ
L953
D954
RU-4YX
C960
16V
1000μ
C961
16V
470μ
L954
F951
T3.15A
L955
C965
200V
10μ
D955
RU-3B
C964
200V
100μ
L956
D956
RU-3B
C967
150V
100μ
C968
150V
22μ
Q971
2SA940-AB. AC
12V-REG
13.4V
11.9V
12.7V
D972
1S2076A
D971
1S2076A
IC971
M5237L
12V-CONTROLL
7.3V
1.2V
0V
R974
220
R975
470
R972
F-47K
R973
F-5.6K
C971
25V
330μ
IC961
L7805
5V-REG
7.9V
4.9V
0V
C962
25V
47μ
VB
PCB-MAIN
V8
Note:
All parts on this PCB are the critical components
obligated to mark with IEC symbol⚠.